JAN 14 1932

This Issue Exceeds 92,000 Copies

THE JOURNAL

OF THE

American Medical Association

Subscription, $7.00 | PUBLISHED WEEKLY | Single Copies, 25 Cents

VOLUME 98, No. 3 | 535 North Dearborn Street, CHICAGO, ILL. | JANUARY 16, 1932

CONTENTS AND SUBJECT INDEX

Clinical Research in Otolaryngology. E. P. Fowler, M.D., New York. 185
Discussed by Drs. Butler, F. O. Lewis, Jones, Josephson, E. R. Lewis and Fowler.

Carbarsone in Treatment of Amebiasis. A. C. Reed, M.D.; H. H. Anderson, M.D.; N. A. David, M.D., and C. D. Leake, Ph.D., San Francisco. 189

Chemotherapy of Amebiasis. C. D. Leake, Ph.D., San Francisco. . 195
Discussed by Drs. Dougherty and Leake.

Relationship of Vitamin A to Respiratory Infections in Infants. L. H. Barenberg, M.D., and J. M. Lewis, M.D., New York. 199

Macrocytosis of the Erythrocytes and Achlorhydria in Pernicious Anemia. Russell L. Haden, M.D., Cleveland 202
Discussed by Drs. Fitzhugh, Ivy, Davis and Haden.

The Pathology and Treatment of Corneal Ulcers. Oscar B. Nugent, M.D., Chicago. 207
Discussed by Drs. Peter, Green, Bahn, Jameson and Nugent.

Mechanical Compression of the Spinal Cord by Tumorous Leukemic Infiltration. Hans H. Reese, M.D., and William S. Middleton, M.D., Madison, Wis. 212
Discussed by Drs. Hassin, Fay, Kernohan, Ayer and Reese.

CLINICAL NOTES, SUGGESTIONS AND NEW INSTRUMENTS

Stethoscope for Obstetricians. B. B. Wechsler, M.D., Pittsburgh. . . . 218

An Unusual Manifestation of Embolism. Oscar Swineford, Jr., M.D., University, Va. 218

Fusospirochetal (Vincent's) Infection of Pleura and Vagina. H. D. Jump, M.D., and S. J. Sperling, M.D., Philadelphia. 219

COUNCIL ON PHYSICAL THERAPY

The Present Status of Light Therapy: Scientific and Practical Aspects. Edgar Mayer, M.D., Saranac Lake, N. Y. 221

COUNCIL ON PHARMACY AND CHEMISTRY 230

COMMITTEE ON FOODS 231

EDITORIALS

The Fuel of the Brain. 232

The Health of the Army. 232

The Thebesian Vessels and the Nutrition of the Heart. 233

CURRENT COMMENT

Now Is the Time to Remit. 234

The Progress of Nutrition as a Science 234

Noise 235

(Subject Index on next page)

ASSOCIATION NEWS 235

Entered as Second-Class Matter, June 25, 1885, at the Postoffice at Chicago, Ill., under Act of March 3, 1879. Acceptance for mailing at special rate of postage provided for in Sec. 1103, Act of Oct. 3, 1917, authorized on June 14, 1918. If undeliverable, forwarding and return postage is guaranteed.

Copyright, 1932, by the American Medical Association. NEXT ANNUAL SESSION, NEW ORLEANS, LA., May 9-13, 1932

NEW FOURTH EDITION

Ranson's Anatomy of the Nervous System

Dr. Ranson has subjected his book to a very thorough revision—both text and illustrations. One of the most important additions is *a series of sections through the brain stem and basal ganglia*, which very greatly increase the value of the book. Each section is accompanied by a key figure showing the plane in which the section was cut. This work has been pronounced the *most beautifully illustrated* and finest in its field.

Dr. Ranson presents his subject from the dynamic rather than from the static point of view; that is, he places emphasis on the developmental and functional significance of structure. He gives a full account of the fundamental neurologic concepts and the gross and microscopic anatomy of the brain, together with a functional analysis of the nervous system and a survey of the conduction pathways. The unusually clear descriptions are augmented by 341 illustrations, some of them in colors.

Octavo of 478 pages, with 341 illustrations, some in colors. By STEPHEN W. RANSON, M.D., Professor of Neurology and Director of the Neurological Institute, Northwestern University Medical School, Chicago. Cloth, $6.50 net

Another SAUNDERS BOOK on Page 3

SUBJECT INDEX TO THIS ISSUE

The letters used to explain in which department the matter indexed appears are as follows: The Star (*) indicates an Original Article; "ab," abstract; "E," Editorial; "C," Correspondence; "MI," Medicolegal; "ME," Medical Economics.

A. M. A. Committee on Scientific Research grants offered 240
now is the time to remit....E-234
time limit for applications for Scientific Exhibit 235
Abdomen pain in child....250
Abortifacient, polyneuritis from....246
Acid, lactic, fuel of brain....E-232
Aerophagy 251
Albuminuria in eclampsia....ab-258
Alopecia of legs in hyperuricemia....ab-266
Aluminum, toxicity ab-266
Amebiasis, carbarsone in....*189; *195; 230
chemotherapy *195
American Board of Obstetrics and Gynecology examination 240
Amytal, effect on autonomic system....ab-261
Anaphylaxis ab-260
Anemia in malarial splenomegaly....ab-264
pernicious, macrocytosis of erythrocytes and achlorhydria in *202
Anesthesia, ether, nitrous oxide, and ethylene, effect of carbon dioxide on....ab-260
local or spinal, blocking hearing in....C-250
Angina Pectoris and eyestrain....ab-265
pain after hemorrhage....251
Angiomatosis, Goldstein heredofamilial..ab-259
Ankle, fracture ab-270
Anthropometric researches on Genoa children 245
Antitoxin production ab-266
Aortic Sinuses of Valsalva, embolism in....*218
Appendicitis, causes of high mortality....ab-261
symptomatology ab-261
Army, U. S., health of....E-232
Arthritis, atrophic, infectious....252
dextrose tolerance tests in....ab-259
Ascites, calcium chloride in....ab-269
Association News 235
Asthma, research on....241
Automobile fatalities 240
Bacteria proteins, hypersensitivity to....ab-257
Bacteriologists, Society of American Bacteriologists 240
Bacteriophage lysate of cholera....ab-264
Bismuth compounds in syphilis....ab-263
Bladder, hernia ab-261
Blood, alopecia of legs in hyperuricemia..ab-266
circulatory hormone of Frey....ab-260
detrusor paralysis with azotemia....ab-270
pressure, high, malignant, simulating brain tumor ab-262
pressure, mean, oscillometric and oscillographic determinations ab-267
Book Notices 254
Books Received ....Adv. page 34
Brain trauma, urea nitrogen in blood and spinal fluid in ab-266
fuel of E-232
tumor, hypertension simulating....ab-262
Breast cancer, cautery in....ab-263
cancer, modern treatment....ab-265
Bureau of Maternity and Child Hygiene...237
Canaliculus lacrimalis absent....ab-259
Cancer, action of mustard gas....ab-265
Carbarsone *189; *195; 230
Carbon Dioxide, effect on ether, ethylene and nitrous oxide anesthesia....ab-260
Cephaloplegia in postdiphtheritic polyneuritis ab-267
Cerebellum and cerebellar localization...ab-270
Chiropractic: practitioner as a "licensed physician or surgeon"....MI-256
Cholera bacteriophage lysate....ab-264
Chronaxia of cardiac vagus nerve....ab-260
Chrysanthemum, sensitization in florists....251
Cigars, nicotine content....246
Clinic tours 240
Cod Liver Oil vs. respiratory infections....*199
Colitis, spastic, belladonna in....252
Colon, irritable ab-261
roentgen examination ab-262
Committee on Foods....231
Compensation of Physicians: liability of husband MI-256
Constipation in infancy....250
Cornea ulcers *207
Correspondence 249
Council on Medical Education....253
Council on Pharmacy and Chemistry....230
Council on Physical Therapy....221
Cranium fracture, pulse and blood pressure in ab-266
injury, urea nitrogen in blood and spinal fluid ab-266
Curtis Clinic dedicated....239
Deaths 248
Dementia Praecox, neurosis-like pictures in ab-270
Depression and health of German people....244
medical manifestations 242
Dionisi, Antonio, death....245
Diphtheria epidemics in France....242
bacillus, effect of radiations....245
polyneuritis after ab-267
proving immunity to: Schick test....252
"septic," symbiosis serum for....ab-267
Diplegia, congenital spastic, cause....ab-270
Dropsy, epidemic, pathology....ab-264
Duodenum papilla and pancreatic ducts..ab-258
Eclampsia, urinary protein in....ab-258
Edema, calcium chloride in....ab-269
Elbow, tuberculous ab-269
Electromagnetic Rays, range of....*222
Embolism gas, cause of congenital spastic diplegia ab-270
in aortic sinuses of Valsalva....*218
Epidemics in France in 1930....242
Erythrocytes, macrocytosis in pernicious anemia *202
Extremities, circulation, histamine test of..ab-259
Eyes operated on with antiglaucomatous iridencleisis ab-270
Eyestrain and cardiac pain....ab-265
Fertility, differential, and overpopulation....242
Fibromyoma, sarcomatous degeneration..ab-258
Fifth Disease, differential diagnosis....245
Foreign Letters 241
Fractures, symposium on....238
Goiter, exophthalmic, iodine in....ab-270
malignant ab-263
Harvard Medical School, lectures at....237
Harvey Lecture, Dr. Crowe to give....238
Health and economic depression....244
institute on public health nursing....237
public, law, and immigration, Turkey....246
report, annual, New York City....239
resorts, foreign, and the depression....242
Hearing, blocking, in local anesthesia....C-250
tests of *185
Heart pain and eyestrain....ab-265
sounds, functional systolic....ab-269
suturing, priority 246
Thebesian vessels and nutrition of....E-233
Hemoglobin, normal concentration....ab-265
Hemophilia, sex hormones and ovarian extracts in C-249
Hemorrhage, anginoid pain after....251
Hiatus oesophageus, hernia....ab-268
Histamine, intradermally to demonstrate jaundice ab-268
test of circulatory efficiency of extremities ab-259
Howard, Harvey J....238
Hypodermic needle, action for breaking of, fails 242
Illegitimacy, aid for unmarried mothers....247
Immigration and public health law, Turkey..246
Immunity, hypersensitivity to bacterial proteins, rôle in ab-257
Inflammatory disorders, roentgenotherapy....245
Infra-Red Rays, biologic effects....*223
Insane, problem, Illinois....236
Internal Medicine, Deutsche Gesellschaft für innere Medizin....243
Iridencleisis, antiglaucomatous, eyes operated on with ab-270
Jaundice, latent, demonstration by histamine intradermally ab-268
Labat Alumni Association....240
Labor, regeneration of endometrium after..ab-258
Lactation, nile blue test of....ab-266
Leishmaniasis, sedimentation rate in....ab-264
Leprosy, leukocytes in....ab-263
Liver, pathology in venous stagnation..ab-264
McAlester Memorial Foundation....236
Mackenzie, James, memorials to....241
Madrazo, Dr., attempted attack against....247
Marriage, examination before....247
Marriages 248
Measles, emphysema of skin in....ab-269
Medical Annals of the District of Columbia..236
Medical Association of Porto Rico....241
Medicine, graduate, M. A. in, Columbia....238
Medicolegal 255
Meetings, Coming Meetings....256
Meningitis, meningococcus ab-257
spinal drainage in ab-262
Meniscus, tearing ab-268
Menopause, irradiation of pituitary or thyroid in ab-269
Micrognathia, congenital 245
Nervous System, autonomic, effect of amytal on ab-261
central, infections, forced spinal drainage for ab-262
Neuritis, peculiar type of polyneuritis....246
New and Nonofficial Remedies....230
News 236
Noise E-235
Nose, operation on nasal septum....252
Nutrition Abstracts and Reviews....E-234
Obstetricians, improved stethoscope for....*218
Old Age, neurochemistry and physiopathology 244
Osteomalacia, blood chemical changes in..ab-264
Otolaryngology, clinical research in....*185
Dr. Portmann gives course in....236
Ovary, rupture of blood cysts....ab-265
Pancreas disease, blood amylase in....ab-259
insulin-free extract ab-260
Pancreatic Ducts and duodenal papilla..ab-258
Paralysis, detrusor, with azotemia....ab-270
symposium on dementia paralytica....239
Parotitis, acute suppurative....ab-258
Pediatric society organized....235
teaching unit 238
Pelvis, chondromatous exostoses....ab-268
Phototherapy, present status....*221
Physicians, English, defrauding, in Spain..247
representatives in the Spanish house of delegates 247
Physiology, International Congress of....241
Pigmentation in light therapy....*227
Pleura, fusospirochetal infection....*219
Pneumococcus antiserum, protective value. ab-260
Pneumonia, croupous, quinine injections for ab-270
effect of intercurrent congenital syphilis on..252
Poliomyelitis, acute anterior, etiopathogenesis..245
epidemics in France in 1930....242
forced spinal drainage in....ab-262
Population, overpopulation and differential fertility 242
Portal Vein, stagnation....ab-264
Portmann, Georges, course in otolaryngology..236
Potassium bromide and the depression....242
Pregnancy, swelling of hands and feet in...252
Puncta lacrimalia absent....ab-259
Queries and Minor Notes....250
Quinine injections in croupous pneumonia.. ....ab-270
Radio medical lectures, abuse of....243
Radio Program 235
Red Rays, biologic effects....*223
Respiratory Tract, cancer, radiotherapy..ab-265
infections and vitamin A....*199
Retina detachments, Gonin operation for..ab-259
Ross Award Fund of America....C-249
Rubeola and fifth disease, differentiating....245
St. Louis Medical Society golden jubilee celebration 238
Sciatica, physical therapy....ab-260
Science, Società italiana per il progresso delle scienze 244
Serum, colloido-osmotic pressure of plasma proteins ab-269
ultraviolet rays effect on plasma clot formation ab-257
Sex hormone, male, research on....243
Silicosis: and workmen's compensation...MI-256
Society Proceedings 256
Spinal Cord, compression by tumorous leukemic infiltration *212
Spirochetosis, fusospirochetal infection of pleura and vagina....*219
Splenomegaly, anemia in....ab-264
State Board Examinations....253
Sterility in women....ab-270
salpingography in ab-270
Stethoscope, improved, for obstetricians..*218
Stomach, achlorhydria in pernicious anemia.*202
Sunlight vs. carbon arc and quartz mercury vapor arc lamp....*226
Syphilis, congenital, presence of spirochete in..250
intercurrent congenital, effect on pneumonia 252
value of compounds employed in....ab-263
Thyroid, cancer, sarcoma, etc....ab-263
Tissues, hygroscopic property....ab-269
Tonics and Sedatives....Adv. page 28
Tuberculosis; and workmen's compensation. MI-255
BCG vaccine, prepared in government laboratory, Turkey....246
immunity to typhoid in....252
in medical and college students....ab-258
pulmonary, rib resection and exeresis of scalene muscles in ab-270
pulmonary, simultaneous bilateral pneumothorax ab-267
Tularemia bacterium in wood tick....ab-257
Tumors, malignant, histogenetic chemotherapy..244
clinic established 236
Typhoid, epidemics in France in 1930....242
immunity to, in tuberculosis....252
Ultraviolet Rays, bactericidal action....*223
effect on plasma clot formation....ab-257
therapy, present status....*221
University of Maryland, lectures....237
new hospital building....237
Urography, intravenous, in infants....ab-262
Uterus, sarcoma of....ab-258
Vagina, fusospirochetal infection....*219
Viosterol vs. respiratory infections....*199
Vitamin A vs. respiratory infections....*199
standardization, committee on....240
Waters, shore, survey of....236
Welfare fund, Brazil....241
Wellcome, Henry S....241
Wrist drop in dementia paralytica with tabes..251

BOOK BUYING SIMPLIFIED
We supply new and standard medical works of all publishers
ONE ORDER—ONE REMITTANCE
GET OUR LATEST BULLETIN
CHICAGO MEDICAL BOOK CO. 435 S. Honore St. CHICAGO

The Journal of the American Medical Association

Published Under the Auspices of the Board of Trustees

VOL. 98, No. 3 CHICAGO, ILLINOIS JANUARY 16, 1932

CLINICAL RESEARCH IN OTOLARYNGOLOGY *

EDMUND PRINCE FOWLER, M.D.
NEW YORK

The otolaryngologist is everywhere severely and often justly criticized for his lack of care in working up his cases. His superficial methods and unrecorded observations are of little or no scientific value. His clinic, like other medical and surgical clinics, is generally thought of and conducted as an institution wholly for the treatment of the sick. This is natural because few persons free of disease apply for medical attention, and the first concern of every clinic should be the best immediate care of the patient. Nevertheless, this is a narrow conception, because it is inadequate to accomplish the greatest good: the study of disease, its cure, alleviation and prevention. Every clinic should be organized for sustained investigations to these ends.

Surely every man worthy of the title "otolaryngologist" must have the urge to contribute something of value to the study of his specialty, and yet the majority act rather as "parties to receive." It is charitable to believe that this is so because there does not seem to be sufficient time, and because of a lack of realization of what any one may accomplish if he but apply consecutive thought and energy to the problems constantly brought before him. Careful, continuous and systematic investigation of natural or experimental phenomena, in order to discover, substantiate or coordinate facts, constitutes research, and every clinic should be, in part at least, a laboratory for research, and every surgeon an investigator.

No matter how small or ill equipped with laboratory facilities, every clinic contains material which, properly examined and studied, will yield interesting and important information. Initiative by the worker is more important than material facilities. Too many patients put such a strain on the clinician that he has not sufficient reserve energy to initiate or carry on serious constructive investigations, and too elaborate laboratory facilities may blunt his faculties by engendering the habit of relying too much on them for diagnosis. If he does not engage in serious and continued investigation, the clinician suffers from lack of advancement in his study of disease and the patient from the lack of knowledge acquired therefrom.

And so from every standpoint clinical research is imperative, unless one is to accept the too usual mediocre standards of service as satisfactory. The foregoing remarks apply both to acute and chronic, and to nonoperative and operative cases, although operative cases as a rule receive much more efficient treatment than those not requiring surgical measures.

Research may be concerned wholly with natural phenomena or with experimental phenomena but is best when it embraces both. All advances in medicine and surgery result from experiment, from trial and error—but not from haphazard trial and error; not from taking a thousand to one shot in the dark, and endangering the patient, gambling with the patient as the loser—but from trial and error along carefully thought out lines, comparing, discovering and coordinating signs and symptoms, and corroborating or denying one's own prior observations and those of other investigators; trial and error systematically, conscientiously and truthfully observed and carefully set down, without bias, for study and future reference.

One often hears, and from those who should know better, some such statement as "Our specialty has reached its limit" or "There has been no real advancement in surgery except in the technic of execution." What rot! Since the world began, pessimism such as this has always proved absurd and always will be. There never has been a brighter outlook for otolaryngology than the present. Never before have collateral sciences contributed so much as today, or promised more for tomorrow.

How may you and I do our share of the work? There are many ways, and the most important is clinical research, without which pure laboratory or pathologic investigations are useless. What should be done to institute clinical research and make it worth while? It would be presuming to suggest any definite method of procedure, because research is one thing (thank heaven) that cannot be standardized; but, granting the urge, let us see how one could go about it. There are several short cuts which will enable one to overcome the time difficulties. The accompanying chart, which has been used as a guide in one otologic clinic, shows a short cut of this type.

It would consume too much time to go over this chart now, item by item, but it is seen to be quite comprehensive and it has been evolved by that time honored method of trial and error through several years. It will be further changed and improved to meet changing demands.

The advantages of such a chart are obvious. The answers to the preliminary questions may be recorded, and sometimes even satisfactorily obtained, by a secretary or assistant, thus relieving the examiner of some of the tedious and time consuming elements in the examination. The appellations, abbreviations and groupings further conserve time and space. The reverse side is left blank for recording observations that do not

* Read before the Section on Laryngology, Otology and Rhinology at the Eighty-Second Annual Session of the American Medical Association, Philadelphia, June 10, 1931.

exactly fit into the standard form. If one will use some such chart as it is designed to be used there can be no doubt that the labor entailed will some day be rewarded by the discovery of coincidences, coordinations, comparisons and accumulations of facts that mean something of importance, that constitute, in fact, a discovery in cause and effect.

From the taking of careful family histories, we know that certain diseases show distinct hereditary backgrounds, but that these backgrounds are not always identical with the disease in question, and that quite unsuspected variations will be associated with definite developments. Some one will say, "What of it? What can you do about it?" A great deal may be done about it. For one thing, an attempt should be made to examine every child in the family of the patient to discover any abnormalities in health or sense, and particularly lesions similar to those in the original patient. In many cases the father and mother and the near relatives should also be carefully examined, especially if there is progressive deafness or any suspicion of tuberculosis, syphilis or bone disease (including otosclerosis). Here is a case in point:

A child comes to the clinic because there is some suspicion of deafness but none of any ear disease, although the hearing is down 35 sensation units for the left ear and 45 sensation units for the right ear. The mother has had two miscarriages; the father has been a waiter in cheap restaurants and hotels. As in every case, a routine blood examination is made, and the Wassermann reaction is shown to be four plus. There are six other children, apparently well, but, nevertheless these six are examined in the same manner as was the first and it is found that all have some loss of hearing and one is a deaf mute. Three give positive Wassermann reactions (from 3 to 4 plus). The mother has a loss of 15 and 25 sensation units for the left and right ears, respectively. The father refuses to be examined. Has it been a waste of time to elicit observations such as these, even though in hundreds of other instances nothing was discovered? Would much have been accomplished if one had not examined the first child more carefully than is usually done and followed this up with careful examination of the rest of the family? Was there any use in doing all this? The answer is obvious. In many, many instances such an examination proves a blessing not only to the child patient but to the whole family and to the community. Note that this is done in an ear clinic. Should it not always be done? Do not imagine that this is a lone instance: in a single year several similar cases have been unearthed and the proper medical management provided. There should be a medical consultant and pediatrician in every otologic or laryngologic clinic and hospital, who is not merely an ornament on the staff. It cannot be said that this is usually the state of affairs.

Another child, otherwise apparently in perfect health, is brought to the clinic because of suppuration of the ear, of several weeks' duration. The tonsils and adenoids have long since been well removed. The management of such a case in the usual way seems quite simple. The mother is told one of a dozen ways in which to cleanse the ear by syringing, drops and other means, or is warned not to syringe the ear but to dry it out with cotton.

Now suppose, instead of this careless procedure, one takes a careful history and elicits the facts that the child has had several recurrent or chronic attacks of earache (or suppurating ears without earache) often coincident with head colds; that the turbinates are greatly swollen, and that mouth breathing persists. The diet and hygiene are faulty. The hearing is down about 25 sensation units in the suppurating ear, and 20 sensation units in the opposite dry ear for the frequencies most used for conversation (300 to 3,000). The eustachian tubes are apparently patent, but in the dry ear congested membrana flaccida and malleus handle indicate a chronic tendency to exacerbations of the always present pathologic condition in the middle ear. Is it enough to treat only the suppurating ear? Evidently not. And yet, have not most of us been guilty of such a narrow handling of such cases? Why is it that only one ear is now actively suppurating? How does the other ear often escape suppuration? This should and can be investigated.

To investigate further, roentgenograms may be taken of the mastoids, the nasal sinuses and the chest. All these may show only slight abnormalities, but, even so they serve as a basis for future comparisons, as do all the other recorded data. When properly carried out, none of these in any way injure the patient. Other tests are often necessary for the complete study of a case. Examine the history cards in most clinics and see, if you have not already seen, how scanty or blank are the recorded clinical observations and laboratory reports. Even the hearing tests are frequently neglected and, if taken, not repeated at proper intervals. The functional tests alone will yield most valuable information and experimental possibilities.

Consider the following: A little child is brought for examination because the school survey shows imperfect hearing (a loss of 25 sensation units), which means, approximately, that this child cannot hear one fourth of the distance a normal child can hear. This child is bright and eager but nervous and undernourished. She has until lately kept up with her class. The teacher thinks her stupid and sometimes inattentive. There is no history of any ear trouble whatever and no one in her family has ever had any ear trouble, or so the mother says, and so most mothers state unless carefully and repeatedly questioned and told that the ear shows signs of prior inflammation. To the whisper test (often done with the child watching the lips of the speaker) the child responds fairly well (there are faint, loud and stage whispers and the latter may indeed be dramatic in consequences).

The sinuses in this case show a marked involvement of the ethmoids and antrums, and the mother reconsiders and remembers that the child has had slight colds intermittently, especially during the winter months. The eustachian tubes are inflated with difficulty, except when the child's head is placed on one side so as to stretch the neck muscles and thus supply better purchases for the tubal abductors during swallowing. What good will routine politzerization once or twice a week do in a case like this? How long will the air in the tympanic cavities remain unabsorbed? Can any one answer definitely? No, but any one will admit that inflation six or eight times a day will be more likely to maintain tubal patency than inflations once, twice or three times a week. Why not teach the child to inflate its own ears with a little balloon inflator at home? It saves time and money and with this child, as in many instances, coaxes the middle ear and tube to normal functioning. If the deafness is due wholly to these troubles it will regularly disappear, but how about the condition in the sinuses? Reliable records indicate that 86 per cent of children with diseases of the ears show

sinus trouble.[1] Do these conditions need any attention or are they to be neglected because it may be that operations on the sinuses of the young are seldom warranted? If repeated roentgenograms are taken, it will be found, especially in children, that coincident with the return of hearing there is a clearing of the sinus exudates or edema, and with every return or exacerbation of the ear disease, with its accompanying lowering of the hearing, there will be return or exacerbation of the pathologic condition in the nasal sinuses. Hundreds of cases prove that this is the rule. If all cases had not been carefully examined and reexamined and charted, it could not have been discovered and proved. These facts suggest that treatment also for sinus disease in the clinic is not enough and that home treatment must supplement the treatment by the physician. Without home treatment, favorable progress is often retarded or annulled. Patients who benefit from the experiment of home treatment will be more faithful in reporting regularly for observation. Here is a field well worth exploring. How many physicians today prescribe anything but the crudest home treatment?

All observations should be charted. Some of us believe it is well to arrange the cases in classes according to the disease, and under age groups within each of these classes (say from 0 to 10, 11 to 15, 16 to 21, and 21 to all inclusive). It is surprising what interesting differences will be found by this method of charting. In deafened children and adults, check-up examinations should be made at stated intervals and all the information therefrom entered so that comparisons may be readily made with the prior data. In such a data sheet for an age group, all the chief symptoms, tests and laboratory observations may be arranged at the top of the page. Several hundred such tabulations will always bring out interesting facts. Without the use of some standard chart form, such a tabulation would be impossible.

If at first nothing new is discovered, one should persevere, because negative observations may be and often are of great importance. For instance, say the blood is examined for its content of calcium and phosphorus. Now these have been reported by many investigators as altered in certain diseases and especially in otosclerosis. Do the results substantiate this contention? Not at all. Careful examinations of fifty-six patients presenting otosclerosis show that the blood calcium and phosphorus varied but seldom from normal limits and even less than in a number of other disease groups. On further inquiry, there appeared to be no reason why they should have been expected to vary.[2] It is extremely useful to check up the investigations of others and to have our own checked up. It is too seldom done. The most radical and even absurd statements are sometimes accepted or rejected, not on their merits or as proved by others, but because of their author's prominence, persistence or personality. Textbooks are full of false teachings, repeated through the ages. Intelligent skepticism is not a bad thing to cultivate, but unless it is intelligent it is an abomination. Merely to doubt is of no value; to doubt and prove that the doubt was warranted (or even that it was unwarranted) is a real and useful investigation.

The whole subject of the functional testing of hearing is a neglected but important field for study, especially in progressive deafness. Today the routine tests as employed are often misleading. It has been shown again and again that, according to the group of tests [2] one uses, diagnosis may vary radically and that the only hope for accuracy lies in a more comprehensive minimum testing and a better interpretation of observations. To accomplish this, the otologist must have some knowledge of physiology and at least the rudiments of physics. Surely he has no business to practice medicine without this knowledge.

It is not necessary to use an expensive audiometer in order to make a satisfactory functional test of the hearing. As has been shown, both air and bone conduction may be accurately measured by properly calibrated tuning forks, and an accurate graph may be constructed.[3] Before and after every operation on the ear, a careful functional test should be made. Only

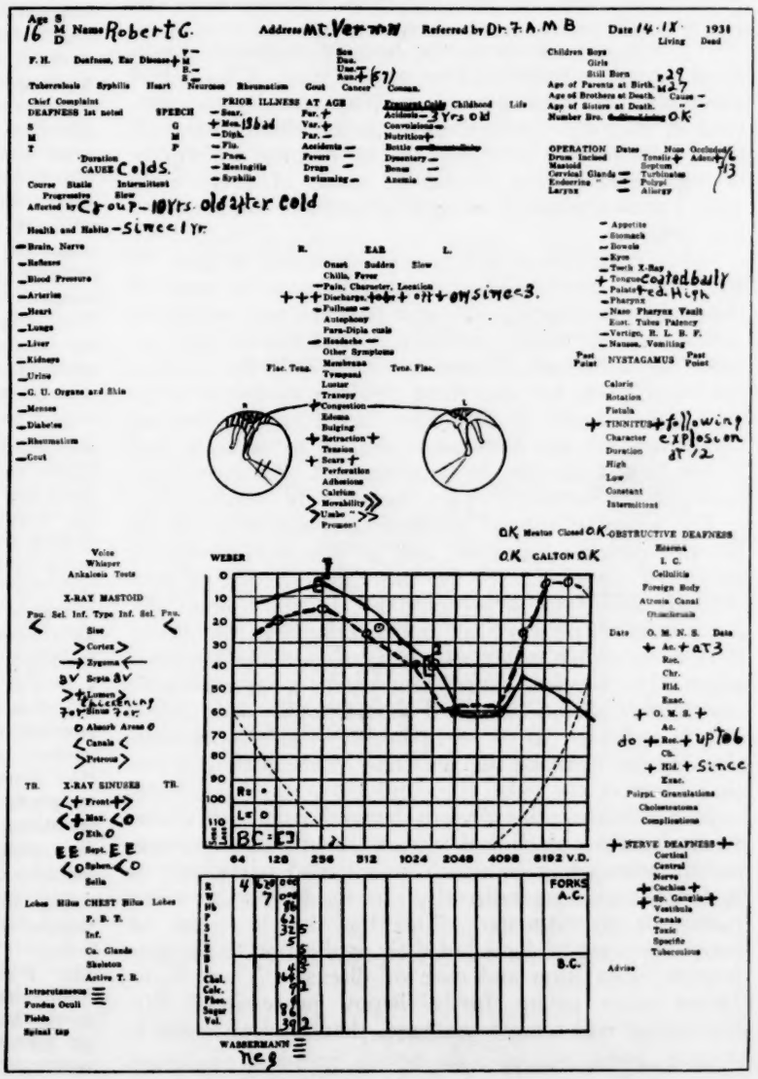


Chart for recording observations. The reverse side is left blank for observations that do not fit into the standard form.

1. Fowler, E. P.: Arch. Otolaryng. **9**: 159 (Feb.) 1929.
2. Fowler, E. P.: Arch. Otolaryng. **13**: 77 (Jan.) 1931.

3. Fowler, E. P.: Arch. Otolaryng. **2**: 529 (Dec.) 1925.

in this way may the results of different procedures be determined. If a careful functional test is made before and after operation (particularly so-called modified and radical mastoidectomy), and before, during and after colds in the head, nasal sinusitis, digestive attacks, and all acute and self-limited diseases, information will be obtained as to how the ear acts under the variations of these diseases. Data may be obtained as to how the ear is affected by changes in climate, altitudes and the weather. Also, data may be obtained to show how the ear is affected by certain physiologic states, such as muscular and nervous fatigue, menstruation and the climacteric, and during intensive concentration on various tasks.

Without any question, the hearing of every school child should be tested at least once a year. This is best accomplished by using the 4 A (phonograph) audiometer. A thorough otologic examination should be made if any deafness is detected. In my opinion a complete otologic examination should be made of every child with a parent whose hearing is affected or who has had ear disease.

It has been found in school children that at least 30 per cent of those showing loss of 9 sensation units at the preliminary survey will later pass the test, indicating that it was not wholly the hearing that was at fault but some psychoneurologic condition. Not only the severely deafened, then, but also these children should be properly looked over. If they have failed in their hearing tests, they are apt likewise to fail in other tests, and it may be at times for the same reasons. All these fields are open for research. They have hardly been touched.

The ultimate aim of all clinical research should be the prevention of disease, and in this field there are unlimited possibilities. Is the otolaryngologist particularly interested in prevention? It would seem not, if his methods of work are any criterion. In fact, there have been known instances when, at least to all appearances, he seemed more interested in questionable operations: operations which should not be done unless clearly indicated to conserve health or life, operations that are apt to make the last state of the patient worse than the first.

In addition to the obvious humanitarian, social and medical values of clinical research, there is its tremendously stimulating influence on all who participate in it directly or even indirectly. Its teaching value alone cannot be overestimated. The chief delight is not the mere discovery of facts but their application to the prevention, alleviation and cure of disease. There is no factor more potent for a happy professional life, because of real service rendered, than clinical research.

140 East Fifty-Fourth Street.

ABSTRACT OF DISCUSSION

DR. RALPH BUTLER, Philadelphia: In the Graduate School of the University of Pennsylvania we are training our second year students in clinical research work. Each student must write a thesis on some subject selected by him and his preceptor with the approval of the faculty and based on investigative work carried out by him under the guidance of the preceptor. Before he is recommended for his degree, this thesis must receive the approval of the faculty. Recently I have read about a dozen of these papers. It is interesting to see how excellent some of them are and to observe the enthusiasm of these young men concerning subjects which are new to them but old and hackneyed to the more experienced men. Moreover, their enthusiasm stimulates their teachers. This system proves that valuable research work may be done by men who are beginning the specialty of otolaryngology. While they may not make many discoveries, they study their cases under the guidance of a preceptor, review the literature, draw conclusions and receive valuable training in clinical research. If these workers continue research after graduation, much valuable information will be added to the fund of knowledge, and they will be better otolaryngologists. There is no reason why other otolaryngologists who are equally trained, industrious and intelligent cannot work in the same way in their own clinics. With proper enthusiasm on the part of the chief of the clinic and on the part of his associates, it would be relatively easy to have this clinical research work carried out all over the country. This is being done perhaps more in other subjects than in otolaryngology, and we should do more of it. Many older men who would like to do research work on subjects in which they are interested do not have time to do it alone, and in this way it could be done with little effort on their part. A chief of clinic can readily supervise the study of several assistants working on different subjects simultaneously, and records of previously studied cases, such as Dr. Fowler so graphically describes, should be used in investigation. Any properly educated student can do most of the work and will be glad to, provided he receives sufficient compensation or credit in the paper, which may be written by the chief or by the assistant, only the two as co-workers. The objective of preparing a paper for presentation before a society or for publication is a valuable stimulus for investigation. Perhaps one obstacle to research is that we are too anxious to have original subjects. This is by no means necessary, because many everyday subjects are far from being exhaustively studied and our conclusions are often based on impressions rather than on facts determined by a large series of carefully recorded observations.

DR. FIELDING O. LEWIS, Philadelphia: Dr. Fowler has mentioned some of the problems of the otologist. As rhinologists, we also have many problems that are yet to be solved. How are we to solve these problems and how are we to stimulate ourselves, our assistants and our students in this urge for investigation? I believe that the head of the clinic can do much in this direction. We have tried to accomplish this in our clinic at the Jefferson Hospital by having monthly staff meetings, and have observed that the younger men in the clinics, as a result of these discussions, have a desire to carry on investigations of problems that we as yet do not understand. I believe that many unnecessary operations are performed on the nose and throat because of the lack of a thorough understanding of the physiology and pathology of the various diseases of our specialty. I also believe that we overlook the fact that many diseases of the nose and throat are local manifestations of some constitutional disturbance rather than manifestations purely of a local disease. Laryngologists, especially the younger men, seem rather inclined to jump at conclusions before a careful study of their patients is made.

DR. MARVIN F. JONES, New York: A new and standard nomenclature based on pathology is badly needed in otolaryngology. This is the prime requisite for a satisfactory cross-file. I believe that all will agree that a cross-file is essential for clinical research. Comparatively few cases can be limited to the field of otolaryngology. It is therefore important that all medical and surgical conditions be noted on our special records. It seems to me that all branches of medicine have become strangers. Modern clinical research seems to be reassembling the prodigal parts. Notations on all changed or new conditions are apt to be slighted. I dare say few physicians derive much pleasure from keeping records. I have employed a stimulant that seems to work well. Each clinician is permitted to choose a research problem. If he has no preference, a problem is assigned. With a little help he is soon going along smoothly under his own initiative. He then is anxious to note progress, and records become automatic. There has always been a conflict in my mind as to which of two courses should be followed. Space, time and personnel being limited, is it better to limit admissions or to rush through the examinations and admit without limit? I find that the most satisfactory work is done in clinics which are active but not rushed. Clinical research has been hampered by accepting theories as facts. These theories have been advanced as theories but have been accepted as facts and used as such in arguments to produce more theories. Of recent years there has been a

healthy trend among our confrères. They are checking up on these early, and I must say in most cases, excellent researches. They are rebuilding on the foundations of physics, physiology, anatomy, pathology and chemistry. A proper equipment for clinical research today includes allied aids as part of its personnel. Instead of labeling ourselves otolaryngologists, we are first of all physicians, and any function of the body affecting the function of the ear, nose or throat concerns us. Advance demands that our clinical researches extend beyond our specialty and that we include in our investigations all branches of medicine and all branches of extramedical sciences contributing aid for successfully treating the sick.

DR. E. M. JOSEPHSON, New York: There is a great need for research in otolaryngology, but there is still lacking a proper scientific background for evaluation of our observations. I shall mention a few of the many fallacious statements handed down through textbooks. Politzer's statement that the tympanic membrane "must not be regarded as an elastic membrane" has been interpreted in later works to signify that the ear drum is totally inelastic, which is absurd. I have been making studies of the effect of altered elasticity of the ear drum, due to interstitial changes named by me "interstitial myringitis." I present two cases which one would place offhanded in the category of nerve deafness or of mixed deafness. Wide incision of the ear drum resulted in an instantaneous improvement of hearing of from 5 to 45 decibels. Persistent politzerization, contrary to the textbook myth, spells damage to the structure of the ear drum, especially in the presence of spasm of accommodation. Clinical research will militate to the advance of our knowledge of the ear as a living structure. But let us reason out our observations logically and evaluate them without bias, accepting only such traditional precepts as can be verified by clinical experiment. Let us not forget our controls in our clinical researches. It is not the volume of our cases which counts; it is the accuracy of observation and the intelligence of their interpretation which is all important in setting the final evaluation on the work. I have never found it possible to conceive of or attain to thoroughgoing clinical research in a large, hurried clinic or service. I feel that the independent worker who conducts his research in a leisurely but thorough manner, at a distance from the crowded institution, and who generally more urgently needs support in his work should be borne first in mind in the distribution of research funds.

DR. EUGENE R. LEWIS, Los Angeles: The day is past when it suffices for a physician to disclaim knowledge of chemistry and physics on the ground that it falls outside his field of work. We have to deal with the physiologic problems of a living organism whose complex operations are physical expressions of chemical changes. Metabolism is but the conversion of inert matter into living form, and living matter into inert form, according to chemical law. We take histories, make examinations and suggest treatments to meet the troubles of our patients, all too frequently without a real working concept of the fundamental chemistry and physics involved. It is a big order, it is a lifetime work, but still the problem remains. A few words about nerve deafness: In the last few years I have studied several cases of so-called nerve deafness, in which it was found that certain constitutional conditions existed which do not fall into the usual category of otologic troubles but which proved to be directly concerned in their causation. Pernicious anemia, avitaminosis and dysendocrinias are among these conditions. With alterations of the underlying etiologic factors, manifested by improvement in paresthesias, stomatitis, gastro-enteric conditions, hematopoietic, metabolic, endocrine and nutritional balances, blood pressures, and sympathetic and central nervous functions, the hearing has improved markedly without especial local attention to the ears. This exemplifies a practical and important approach to these problems in otology and rhinology.

DR. E. P. FOWLER, New York: In regard to staff meetings, I think that they are stimulating, but only if a case which has been properly worked up is given—not if haphazard reports are submitted. I think there is no better training for a young man in a clinic than to have every two weeks or every month a case to work up for his confrères, because they certainly will censure him if he does not work it up properly. In regard to useless operations, I agree absolutely, and, as to manifestations of general disease, my position is made clear by the mere fact that my chart contains so many figures and names of diseases. They may not have to be used, but they serve as a reminder that these diseases exist and may have to be recognized in connection with the ear, nose or throat trouble. If one does not have a reminder in front of him he often overlooks a lot of possibilities. I have been making short notes for years, but I find that unless I also have a chart before me I sometimes shirk the full task. One can devote at least part of one's clinic to intensive investigation, but one cannot do it with a whole clinic of 150 people a day. I think that symbols are often much better than words. As soon as one gets used to the symbols, one does not have to read words. One looks at the chart and envisions the whole case at a glance. Our hospitals are using more and more symbols on the charts, especially for x-ray work. Graphs are often not what they seem. In my opinion we have to revise our conception of what the functional tests mean, in view of any audiometric tests by air and by bone conduction. For instance, I do not believe that loss of bone conduction always means nerve deafness. The important thing is always to put these things down so that we shall keep a record of any progress, and in this way we shall certainly get further than if we do not do so.

CARBARSONE IN THE TREATMENT OF AMEBIASIS*

A. C. REED, M.D.

H. H. ANDERSON, M.D.; N. A. DAVID, M.D.

AND

C. D. LEAKE, PH.D.

SAN FRANCISCO

The usual treatment of amebiasis is unsatisfactory. Of the numerous drugs used and/or recommended, no single one nor combination meets the requirements for satisfactory therapy. These are that the drug shall be clinically nontoxic, shall be highly curative without adjuvants, shall be available for oral administration, shall interfere little if at all with the usual activities of the patient, and shall be of low cost. Such an agent might also offer hope of drug prophylaxis, which thus far has not been attainable.

The seriousness of the therapeutic situation in amebiasis is apparent especially when one considers the relatively high incidence of the malady and the general disappointment with present methods of treatment. It is surprising that no systematic chemotherapeutic survey of the disease has been attempted until recently,[1] in spite of the long standing example of Ehrlich's[2] success in comparable protozoan infections.

INCIDENCE

Reports on its epidemiology generally agree that amebiasis is found almost all over the world, that its incidence is highest in tropical regions or where conditions of moisture, warmth and defective hygiene favor easy transfer, and that it is widely distributed over the United States. James[3] has concluded, on the basis

* From the Pacific Institute of Tropical Medicine in the Hooper Foundation for Medical Research.

* This report is based on part of an extended cooperative study of the chemotherapy of amebiasis conducted by the Pacific Institute of Tropical Medicine in the Hooper Foundation for Medical Research and the Pharmacological Laboratory of the University of California Medical School, San Francisco. It has been supported in part by Eli Lilly & Co., Indianapolis, and the Ciba Company, Inc., of New York. Valuable technical assistance has been rendered by Miss D. A. Koch. We are indebted also to Dr. E. F. Boyd of Los Angeles for permission to study four cases treated by him.

1. Leake, C. D.: Chemotherapy of Amebiasis, THE JOURNAL, this issue, page 195.

2. Ehrlich, P., and Hata, S.: Die experimentelle Chemotherapie der Spirillosen, Berlin, 1911.

3. James, W. M.: Diagnosis of Intestinal Amebiasis, J. A. M. A. 89: 1469 (Oct. 29) 1927.

TABLE 1.—*Clinical Data on Patients Harboring E. Histolytica*

Case; Name	Age	Sex*	Nationality	Residence in Years Outside U. S. A.	Occupation	Chief Complaint	Duration of Illness	Associated Diagnoses and Previous Operations	Sigmoidoscopic and Roentgen Observations	Other Observations
1 L. H.	60	♀	American	None	Housewife	"Gas"	10 yrs.	Hypertension, hemorrhoids, and arthritis; colporrhaphy in 1921	Hypertrophic arthritis of dorsal vertebrae	B. P. 170/110
2 R. S.	42	♀	American	None	Housewife	Abdominal pain	?	Chronic trachoma and hemorrhoids; tonsillectomy in 1929	Negative except hemorrhoids; long, redundant sigmoid loop with adhesions	Palpable mass in lower abdomen
3 G. A.	35	♂	Peruvian	Peru, 23 years	Bus boy	Sour eructations	3 yrs.	None	None	None
4 I. V.	63	♂	Mexican	Mexico, 59 years	Cattleman	Abdominal discomfort	?	Syphilis (Wass. ++++)	Negative	Chronic degenerative cardiovascular disease; B. P. 190/110
5 I. G.	29	♀	American	None	Housewife	Diarrhea	1 yr.	Thyrotoxicosis	Ulcerated mucous membrane (smear + E. histolytica)	Occult blood in stools; Hgb. 70% (S.)
6 L. J., Jr.	1.5	♂	Mexican	Mexico, 1 year	None	Dysentery	1 mo.	Secondary anemia	None	Hgb. 28% (S.); R.B.C. 1,620,000; on discharge Hgb. 85% (S.); 4 transfusions
7 R. H.	24	♀	Peruvian	Peru, 23 years	Housewife	Abdominal pain	?	Cholecystitis, and cervical adenitis (Tbc.)	Redundant colon	Urobilin in urine; icterus index 15; positive Murphy's maneuver
8 H. C.	33	♂	Peruvian	Peru, 24 years	Schoolboy	"Headache"	2 yrs.	Syphilis (Kahn 2+)	None	None
9 C. C.	17	♀	American	None	Schoolgirl, milliner	Constipation and "worms"	2 mo.	Craigia infestation; tonsillectomy in 1928	None	None
10 J. J.	26	♀	American	Mexico, 10 years	Housewife	None	.....	Pregnancy	None	Normal delivery at term
11 J. J., Jr.	6	♀	American	None	None	None	.....	Hymenolepis nana infestation	None	None
12 B. R.	21	♀	Nicaraguan	Nicaragua, 19 years	Housewife	Epigastric pain	4 mo.	Polyglandular dystrophy	Liver and spleen enlarged	Duodenal contents negative for amebas; icterus index 10
13 A. F.	30	♂	American	U. S. Army, all over the world 6 yrs.	Machinist	Diarrhea	1.5 mo.	Appendectomy in 1922, and tonsillectomy in 1928	None	None
14 E. R.	41	♀	American	England, 20 years	Housewife	"Bilious attacks"	11 yrs.	Cholecystitis with cholelithiasis; varicose veins	None	Positive Murphy's maneuver
15 L. K.	38	♀	Finnish	Finland, 18 years	Nursemaid	Joint pains	6 mo.	Obesity with slight hypertension, arthritis, varicose veins; appendectomy and tonsillectomy in 1915	None	B. P. 160/100
16 G. S.	34	♂	Maltese	Malta, 11 years	Laborer	Dysentery	10 yrs.	Appendectomy in 1926	Ulcerated mucous membrane (smear + E. histolytica); spasticity of colon	Icterus index 14; 50% phthalein excreted in 2 hours
17 L. J.	36	♂	American	None	Laborer	Emesis	7 mo.	None	None	None
18 J. M.	35	♂	American	Philippines, 2 years; all over world for 19 years	Seaman	"Worms"	2 wks.	Hypertrophic arthritis	None	None
19 L. R. G.	59	♀	American	Italy, 1 year	Housemother	Diarrhea	1 yr.	Chronic cholecystitis	Deformity of duodenal bulb and second portion of duodenum	Tenderness in gallbladder region
20 H. R. H.	41	♀	American	Singapore, 3 years; Brazil, 2 years	Housewife	Exhaustion and tiredness	6 mo.	None	None	B. P. 106/80
21 B. R. G.	59	♂	American	England, 9 years	Lawyer	Diarrhea	3 mo.	Bronchiectasis, hepatitis and arthritis	None	Tender, palpable colon, liver enlarged and tender
22 H. R. S.	52	♂	American	None	Shoemaker	Diarrhea and constipation	10 yrs.	Hernia, obesity and oral sepsis	X-rays: pericecal adhesions	Liver edge felt 3 cm. below costal margin
23 U. R. V.	2.5	♂	American	South China, 2 years	None	Anorexia and insomnia	6 mo.	None	None	None
24 H. R. W.	30	♀	American	North India, 5 years	Missionary	Fatigibility	?	Perineal tear	None	Enlarged thyroid, tenderness on right side of abdomen
25 Q. R. W.	4.5	♀	American	None	None	Diarrhea	2 yrs.	Cyclic vomiting and secondary anemia	None	Hgb. 65% (S.); R.B.C. 3,750,000; enlarged tonsils and cervical nodes
26 R. R. M.	55	♂	American	None	Executive	Diarrhea	2 mo.	Trichomoniasis, intestinal; labyrinthitis; hemorrhoidectomy and appendectomy in 1915; tonsillectomy in 1930	"Spastic colon"; mucous membrane is inflamed with small ulcers	Liver felt 3 cm. below costal margin; colon palpable and tender
27 O. R. C.	32	♂	American	Korea, 5 years	Missionary	Over-tiring and constipation	?	Hyperthyroidism, varicocele and tonsillitis; tonsillectomy and varicocele removal, 1930	None	Thyroid enlargement; tonsils infected; cervical adenopathy; B. P. 108/80
28 E. R. L.	55	♀	American	None	Secretary	Pruritus ani	"Many years"	Chronic cholecystitis, hemorrhoids, and oxyuriasis	Proctitis, hemorrhoids	Tenderness in gallbladder region; B. P. 102/84
29 W. R. S.	47	♂	Norwegian	Norway, 14 years; at sea, 33 years	Ship captain	Dysentery	6 wks.	Chronic arthritis	Mucous membrane bleeding, and mucus covered; many small sharp ulcers	Evidence of spinal arthritis; B. P. 102/80
30 M. R. M.	21	♀	American	None	Student	Vomiting and exhaustion	2 yrs.	Trichomoniasis, intestinal; pituitary deficiency; appendectomy in 1929	X-rays, intestinal tract, negative	Thyroid enlarged; general asthenia; absent patellar reflexes; B. P. 102/68

* In this column, ♂ indicates male; ♀, female.

TABLE 1.—*Clinical Data on Patients Harboring E. Histolytica—Continued*

Case; Name	Age	Sex	Nationality	Residence in Years Outside U. S. A.	Occupation	Chief Complaint	Duration of Illness	Associated Diagnoses and Previous Operations	Sigmoidoscopic and Roentgen Observations	Other Observations
31 F. R. M.	35	♀	American	None	Housewife	Dysentery and constipation	1.5 yrs.	Chronic arthritis; appendectomy and tonsillectomy in 1917; uterine suspension in 1927	X-rays: pericecal adhesions	Palpable, tender sigmoid; tender cecum; B. P. 104/82
32 H. R. D.	11	♂	American	Philippines, 10 years	Student	Dysentery	1 yr.	None	None	None
33 J. R. D.	5	♀	American	Philippines, 5 years	None	Ill health	1 yr.	Intestinal chilomastix and trichomonas	None	Cervical adenopathy; carious teeth
34 T. R.	23	♀	Mexican	Mexico, 22 years	Housewife	"Worms"	1.5 yrs.	Teniasis (T. saginata)	None	Liver edge felt 3 cm. below costal margin
35 A. M.	8	♂	Mexican	Mexico, 6 years	Schoolboy	"Tiredness"	?	None	None	None
36 C. M.	16	♀	Mexican	Mexico, 14 years	Schoolgirl	"Languid"	1 mo.	None	None	Congenital (?) heart disease
37 P. B. C.	41	♂	American	India, 12 years	Missionary	Ill health and constipation	5 yrs.	Secondary anemia and tonsillitis	None	None
38 E. B. S.	19	♀	American	None	Nurse	Diarrhea	2 mo.	None	None	None
39 L. B. C.	33	♂	American	None	Teacher	Constipation and abdominal pain	5 yrs.	Chronic appendicitis	None	None
40 E. B. W.	26	♂	American	India, 22 years	Student	Constipation	2 yrs.	None	None	None

of reliable surveys made since 1916, that the incidence of amebiasis in the general population is likely to be between 5 and 10 per cent in areas where amebic dysentery itself is not endemic, but higher where it is. Our experience in California confirms James's conclusions and is comparable to that noted by Kessel and Kofoid.[4] It might be claimed that the mere fact of a relatively high incidence of amebiasis (particularly when the disease often exists without symptoms) is no reason for therapeutic alarm. The malady is, however, always potentially dangerous, not only to the individual patient but also by transfer to uninfected persons. James[5] states that "whether it is always a tissue parasite, or whether it can live harmlessly for long intervals in the lumen of the bowel, histolytica is invariably an enemy of its host, actively or potentially, and should be treated as such whenever and wherever found."

CRITICAL EVALUATION OF CURRENT TREATMENT

The drugs so far suggested for the therapy of amebiasis may be classified as follows: (*a*) alkaloids, such as those of ipecac or kurchi; (*b*) oxyquinoline derivatives, such as chiniofon ("yatren"); (*c*) organic arsenicals, such as acetarsone ("stovarsol"), and (*d*) miscellaneous antiseptics and astringents, such as the alkyl resorcinols and bismuth compounds.

These types of amebacidal agents have been critically evaluated[1] on the basis both of laboratory and of clinical studies. Emetine, the most commonly used drug in amebiasis, is only partially effective in doses which too often are dangerous, especially to the heart, and there seems to be little hope of finding among the ipecac alkaloids a drug meeting the requirements for satisfactory therapy in this disease.[6] The kurchi alkaloids have little if any useful effectiveness.[7] Critical data are not yet available to judge properly of the value of the alkyl resorcinols, although they are interesting.[8] It is indicated that more satisfactory amebacides are to be found among the oxyquinoline derivatives than chiniofon, the only one so far exploited,[9] but, since systematic investigation of this group has scarcely begun, conclusions cannot be drawn at the present. Certainly chiniofon has not been as successful as was hoped it would be. Of the organic arsenicals, only acetarsone has been much used in amebiasis, but experience shows that it is only slightly effective and then at doses too often dangerous.[10]

CARBARSONE

The circumstances leading to the clinical trial in amebiasis of 4-carbamino-phenyl arsonic acid (called "carbarsone" for convenience) have already been discussed.[1] The compound $H_2O_3As.C_6H_4.NHCONH_2$, was first prepared by Ehrlich,[11] and is a white crystalline solid, stable in air, without odor or taste, and contains 28.85 per cent of arsenic when anhydrous. It is practically insoluble in water but dissolves in alkaline aqueous solutions, and it melts at 174 C. It was furnished for this study by the Lilly Research Laboratories, Indianapolis, through the courtesy of Dr. H. A. Shonle.

Carbarsone is absorbed on oral administration and is excreted in the urine at about the same rate as acetarsone.[12] Experimentally it is less toxic than acetarsone but more amebacidal, its "therapeutic index" being about eight times as favorable as acetarsone.[13] Since

4. Kessel, J. F., and Mason, V. R.: Protozoan Infection of the Human Bowel, J. A. M. A. **94**: 1 (Jan. 4) 1930. Kofoid, C. A.: Statistical Summary of Persons Examined for Protozoa, 29th Biennial Report, California State Board of Health, Sacramento, 1926, p. 23. The incidence among new arrivals at San Quentin prison, as determined by us in a current survey, corresponds to that noted by these investigators.

5. James, W. M.: Some Observations on Intestinal Amebiasis Due to Infection with Entameba Histolytica, 16th Annual Report, Medical Dept., United Fruit Company, New York, 1927, p. 185.

6. Anderson, H. H., and Leake, C. D.: Oral Toxicity of Emetine Hydrochloride and Certain Related Compounds in Rabbits and Cats, Am. J. Trop. Med. **10**: 249 (July) 1930. Rinehart, J. F., and Anderson, H. H.: Effect of Emetine on Cardiac Muscle, Arch. Path. **11**: 546 (April) 1931.

7. Knowles, R.: Report of Professor of Protozoology: Amebiasis, Annual Report, Calcutta School of Tropical Medicine, 1930, Calcutta, p. 51. Six patients suffering from amebiasis were intensively treated with kurchi bismuth iodide from two independent sources by one of us (A. C. R.) without even temporarily clearing the stools of E. histolytica.

8. Faust, E. C.: Experiments on the Effect of Di-Hydranol on Intestinal Protozoa of Man and Laboratory Mammals, Proc. Soc. Exper. Biol. & Med. **27**: 905 (June) 1930. Ratcliffe, H. L.: Am. J. Hyg. **10**: 643 (Nov.) 1929. David, N. A., and Leake, C. D.: Toxicity and Balantidicidal Action of "Di-Hydranol" in Guinea-Pigs, Proc. Soc. Exper. Biol. & Med. **28**: 196 (Nov.) 1930. Anderson, H. H.; David, N. A., and Leake, C. D.: Oral Toxicity of Certain Alkyl Resorcinols in Guinea-Pigs and Rabbits, ibid. **28**: 609 (March) 1931. However, in actual clinical trials in six cases of amebiasis with heptyl resorcinol in recommended doses, one of us (A. C. R.) was unable to obtain any evidence of clearance of stools of E. histolytica. Dr. L. M. Boyers of Berkeley, Calif., was similarly unsuccessful in attempting to treat amebiasis with heptyl resorcinol (personal communication to the authors).

9. Anderson, H. H.; David, N. A., and Koch, D. A.: Effects of the Halogenation of Oxyquinoline on Biological Activity, Proc. Soc. Exper. Biol. & Med. **28**: 484, 1931. Anderson, H. H., and Koch, D. A.: Iodochloroxyquinoline (Vioform, N. N. R.) as an Amebacide in Macaques, ibid. **28**: 838 (May) 1931.

10. Bender, W. L.: Stovarsol Poisoning, Am. J. M. Sc. **174**: 819 (Dec.) 1927. Anderson, H. H., and Leake, C. D.: Toxicity of Acetarsone, Proc. Soc. Exper. Biol. & Med. **27**: 267 (Dec.) 1930.

11. Ehrlich, P., and Bertheim, A.: U. S. patent 937929, 1909.

12. Chen, M. Y.; Anderson, H. H., and Leake, C. D.: Rate of Urinary Arsenic Excretion After Giving Acetarsone ("Stovarsol") and "Carbarsone" by Mouth, Proc. Soc. Exper. Biol. & Med. **28**: 145 (Nov.) 1930.

13. Leake, C. D.; Koch, D. A., and Anderson, H. H.: Effect on Biological Activity of Substituting Sulphur for Oxygen in an Organic Arsenical Compound, Proc. Soc. Exper. Biol. & Med. **27**: 714 (Oct.) 1930.

it contains a substituted amino group in the para position to the arsenic atom, its clinical use must proceed cautiously until it is established whether or not it may injure the optic tract.[14] As with arsenicals generally, it is contraindicated in the presence of kidney or liver disease and hence should not be used in amebic hepatitis.

On laboratory animals it seems to have a marked effect, and no untoward symptoms have been noted following its continued administration within the oral administration of doses within the therapeutic range (50 mg. per kilogram daily for ten days in monkeys) no toxic symptoms were noted, and in rabbits killed by air injection after receiving 30 mg. per kilogram daily for ten days no evidence of tissue injury was found on microscopic study.

TABLE 2.—*Amebiasis Patients Receiving Carbarsone Therapy with Some Data on Response to Treatment*

Case	Name	Age	Weight, Kg.	Carbarsone, Gm.	Duration of Treatment	Other Therapy	Response Stools*	Response Symptoms*	Follow-up Period, Mo.
1	L. H.	60	54.5	2.5	10 days	None	—E. hist.	Good	4.5
2	R. S.	42	50.0	2.5	10 days	None	—E. hist.	Good	6
3	G. A.	35	60.3	5.0	4 mo.	None	—E. hist.	Good	5.5
4	I. V.	63	61.3	2.5	10 days	"Bismudol" 2 cc. I-M. weekly	—E. hist.	Good	8
5	I. G.	29	57.2	5.0†	10 days	None	—E. hist.	Good	5
6	L. J., Jr.	1.5	12.7	1.2	2 mo.	Frequent transfusions	—E. hist.	Good	4.5
7	R. H.	24	53.6	4.75	3 weeks	X-rays to cervical nodes	—E. hist.	Good	6
8	H. C.	33	60.3	5.0	10 days	None	—E. hist.	Good	5
9	C. C.	17	40.8	3.0	15 days	None	—E. hist.	Good	6
10	J. J.	26	55.3	5.0	20 days	None	—E. hist.	Good	6
11	J. J., Jr.	6	20.0	2.0	20 days	None	—E. hist.	Good	5.5
12	B. R.‡	21	70.0	5.0	5 weeks	Thyroid 0.03 t.i.d.	—E. hist.	Good	6
13	A. F.	30	59.0	5.0	10 days	None	—E. hist.	Good	4
14	E. R.	41	84.9	2.5	10 days	None	—E. hist.	Good	10
15	L. K.	38	77.3	5.0	20 days	Thyroid 0.03 t.i.d.	—E. hist.	Good	3
16	G. S.‡	34	66.3	12.5†	3 mo.	None	—E. hist.	Good	8
17	L. J.	36	59.0	5.0	10 days	Sippy regimen	—E. hist.	Good	5
18	J. M.	35	70.9	5.0	10 days	None	—E. hist.	Good	3
19	L. R. G.	59	70.5	3.5	10 days	None	—E. hist.	Good	7
20	H. R. H.	41	62.2	3.0	10 days	None	—E. hist.	Good	8
21	B. R. G.	59	67.2	3.3	11 days	None	—E. hist.	Good	4
22	H. R. S.	52	78.6	3.0	10 days	None	—E. hist.	Good	3
23	U. R. V.	2.5	16.6	3.4	6 weeks	None	—E. hist.	Good	4
24	H. R. W.	30	67.2	4.0	10 days	None	—E. hist.	Good	7
25	Q. R. W.	4.5	15.7	1.0	10 days	None	—E. hist.	Good	6
26	R. R. M.	55	80.5	5.0	10 days	Bismuth subcarbonate, after stools cleared	—E. hist.	Good	3
27	O. R. C.	32	64.9	3.0	10 days	None	—E. hist.	Good	3
28	E. R. L.	55	66.3	5.0	10 days	Quassia enemas for oxyuris infection	—E. hist.	Good	3
29	W. R. S.‡	47	59.9	10.0	5 weeks	None	—E. hist.	Good	1§
30	M. R. M.	21	57.6	4.0	10 days	Glandular therapy	—E. hist.	Good	3
31	F. R. M.‡	35	62.2	6.0	6 weeks	None	—E. hist.	Good	5
32	H. R. D.‡	11	40.0	4.0	8 days	None	—E. hist.	Good	3
33	J. R. D.	5	22.4	2.5	10 days	None	—E. hist.	Good	3
34	T. R.	28	48.1	4.0	4 mo.	None	+E. hist.	Good	4
35	A. M.	8	31.8	2.5	10 days	None	+E. hist.	Good	3
36	C. M.	16	39.5	3.0	10 days	None	+E. hist.	None	3
37	P. B. C.	41	75.0	5.0	10 days	None	—E. hist.	Good	3
38	E. B. S.‡	19	53.6	5.0	10 days	None	—E. hist.	Good	3
39	L. B. C.	33	65.9	5.0	10 days	None	—E. hist.	Good	3
40	E. B. W.	26	68.6	5.0	10 days	None	—E. hist.	Good	3
Average.....		31.6	56.1	4.2	21.7 days				4.55

* During 3 to 10 months follow-up period.
† Also retention enemas of carbarsone, 2 Gm. nightly for 10 times.
‡ Previous therapy with various amebacides without benefit.
§ Further check-up impossible, but patient clinically well and stools ameba-free on repeated culture.

therapeutic range. With minimal single lethal doses of carbarsone administered in gelatin capsules by mouth (150 mg. per kilogram in guinea-pigs, 200 mg. per kilogram in rabbits, and from 200 to 250 mg. per kilogram in cats), animals may present symptoms of lethargy, loss of weight, abdominal distention, diarrhea, sluggish reflexes, and failure of the pupils to respond to light. Histologic examination of animals dying from such doses revealed some renal necrosis. On repeated

14. Young, A. G., and Loevenhart, A. S.: Relation Between Chemical Constitution of Certain Organic Arsenical Compounds to Their Action on the Optic Tract, J. Pharmacol. & Exper. Therap. **23**: 107 (March) 1924.

CLINICAL USE OF CARBARSONE

In the clinical evaluation of carbarsone in amebic therapy, our first consideration was to establish adequate standards for diagnosis. The term amebiasis is used here to designate infestation with E. histolytica as proved by the finding of cysts or active forms in the stools. Diagnosis of amebiasis must invariably depend on such a microscopic observation, and technically expert examination is required. In all cases here discussed, microscopic diagnosis was made or confirmed by iron hematoxylin stains of fixed preparations, and in many instances further confirmation was obtained by cultural methods.

Each patient reported on herewith was, of course, subjected to detailed clinical examination. Significant observations, especially those relating to the diagnosis, are summarized, for each of the forty cases studied, in table 1. The average age for the group was 32 years. There were twenty-eight Americans, sixteen of whom were never out of the United States. Other nationalities represented were: Mexicans, five; Peruvians, three, and Norwegian, Finn, Maltese and Nicaraguan, each one. Twenty-one were females and nineteen were males. Fifteen occupations were encountered, of which there were eleven housewives, seven students and three missionaries. The chief complaint in thirty-one cases was referable to the gastro-enteric tract, thirteen patients complaining of diarrhea or dysentery, seven of constipation, and four of abdominal pain. The average duration of illness was about two years. Six patients had been subjected to appendectomies without benefit. Associated diagnoses were made in twenty-nine cases, in six of which arthritis was noted. Of patients examined by sigmoidoscopy, four showed an ulceration of the mucous membrane of the lower bowel. Significant roentgen observations in the colon and cecum were noted in six individuals.

Another important consideration for us in trying to estimate the clinical effectiveness of carbarsone in amebiasis was to settle on suitable criteria for "cure." For the purposes of this report we decided arbitrarily on (*a*) symptomatic relief, (*b*) clinical improvement, and (*c*) consistent failure to find cysts or motile amebas in the stools on very frequent and careful examination for a follow-up period of at least three months after the cessation of treatment. During this post-therapeutic observation period, we obtained from each patient at least three stool specimens at daily intervals every two weeks and searched these most thoroughly for cysts or active forms. Meanwhile, of course, hygienic advice was offered, and in certain cases a strict hygienic regimen was prescribed, in the effort to prevent reinfection.

In the administration of carbarsone we felt confident in following the example afforded by acetarsone ("stovarsol"), for our experimental work assured us that carbarsone in comparable doses was not only likely to be more effective than acetarsone in amebiasis but also definitely less toxic. Accordingly, we began our therapeutic trials in adults with a course of treatment in which 0.25 Gm. was administered by mouth in a hard gelatin capsule twice daily for ten days to reach

a total of 5 Gm. For children, the individual and total dosage was reduced in proportion to age.

Table 2 summarizes the therapeutic data in the cases of E. histolytica infection treated with carbarsone. The average weight for this group of patients was 56 Kg. The drug was given in a total oral dosage averaging 4.1 Gm. over a three weeks' period. The largest dose administered was 204 mg. per kilogram during six weeks (case 23) without exhibition of arsenic toxicity. The smallest dose which proved effective was 29 mg. per kilogram (case 14). The average total dose, based on body weight, was about 75 mg. per kilogram. We would recommend this dosage as a relatively safe one to employ and suggest calculation on this basis of the approximate total amount to be given as one course of treatment. This total for each patient should then be administered orally in divided doses over at least a ten day period. During and following treatment, no toxic effects of any sort were observed in our patients, although in ten before treatment there were indications of liver injury.

TABLE 3.—*Parasitic Response to Carbarsone Therapy*

Intestinal Parasite	Number of Cases Positive Before Treatment	Number of Cases Positive During Follow-up Period	Number of Cases Negative During Follow-up Period*
E. histolytica	40	3	36†
E. coli	18	2	16
E. nana	18	8	12
Iodamoeba buetschlii	6	2	4
Chilomastix	6	4	2
Giardia	10	4	6
Trichomonas	4	0	4
Strongyloides	1	1	0
Trichiuris	1	0	1
Craigia	1	0	1
Mixed infections‡	32	13	19

* Average follow-up period for series of 40 patients was 4.55 months.
† Patient 29 (W. R. S.) clinically well. Stools negative for E. histolytica on repeated examination (fixed wet iron-hemotoxylin and culture) for one month after treatment, when further observation was rendered impossible.
‡ E. histolytica and one or more other parasites found in the same patient.

The parasitic response to carbarsone is shown in table 3. Of our forty amebiasis cases, all were freed from E. histolytica in the stools during treatment, and thirty-six remained so for an average post-treatment observation period of four and a half months. In only one instance (case 29) was the follow-up period shorter than three months, and here the stools had remained clear until one month after treatment, when the exigencies of sea duty prevented further observation. Three patients (34, 35 and 36) would not cooperate in maintaining a satisfactory hygienic regimen in an environment demonstrably favorable to reinfection, and furthermore we know they did not take the full course of carbarsone prescribed for them.

Concurrent infections with other protozoa besides E. histolytica were present in a majority of the cases. There were eighteen simultaneous E. coli infections, sixteen of which became negative after treatment. E. nana was also present in eighteen instances and was eradicated in 12. Chilomastix and Iodamoeba buetschlii were found in six instances each, of which four of the Iodamoeba cases were cleared but only two of the Chilomastix. Associated Trichomonas infection responded favorably to carbarsone therapy in two patients, while six of ten originally positive for Giardia became negative.

Table 4 has been included to show the effect of carbarsone on a group of ten patients harboring "nonpathogens" alone, without E. histolytica. Only three of the patients had complaints referable to the gastroenteric tract. In all three (J. W., infested with Diendamoeba fragilis, and L. B. J. and E. R. F. with E. coli) these symptoms subsided with clearance of the stools. Of the eight E. coli infestations, seven were cleared. Four each were positive either for Chilomastix or E. nana, and three of each became negative following therapy, but in no case were symptoms present at onset. Giardia and Iodamoeba buetschlii were found in one patient each and were absent during the follow-up period. These inconclusive effects were roughly parallel to the response of these "nonpathogens" to carbarsone treatment in the presence of E. histolytica. They are reported chiefly to increase the number of patients we could demonstrate as having tolerated carbarsone therapy without any untoward reactions.

COMMENT

While the number of cases of amebiasis successfully treated with carbarsone as here reported is inadequate as a basis on which to render conclusive judgment regarding the efficacy of the drug in this disease, it is enough, in light of the critical care with which our attempted clinical evaluation was made, to justify further extensive clinical trial at independent hands in order to determine whether or not our results may be confirmed.

Exception may be taken to our admittedly arbitrary criteria of "cure" in amebiasis, but we set up, we believe, at least as rigorous standards as have been used in the clinical evaluation of any other drug proposed for amebic therapy. Of the first forty amebiasis patients coming into our hands for treatment with carbarsone, thirty-six were "cured" according to our criteria. Of the four not recorded as "cured" of amebiasis, one was impossible to observe for longer than one month after cessation of treatment (during which period he was, however, free from E. histolytica), and the other three did not take the prescribed course of therapy with the drug and were known to be exposed to continued reinfection. It is left to others to estimate the degree of effectiveness of carbarsone in amebiasis.

Six of our forty patients had been unsuccessfully treated previously for amebiasis: one (patient 12) with emetine alone; two (31 and 38) with emetine and acetarsone; one (32) with emetine and chiniofon; one (29) with bismuth subcarbonate, and one (16) with practically every chemical proposed for use in amebiasis.[15] While there was temporary clearance of stools in each instance except case 29, in none of these patients were the stools free from E. histolytica for longer than four weeks after the recommended course of treatment with the drugs indicated, until carbarsone was employed.

During carbarsone therapy, ten patients also received other treatment, not antiamebic, as noted in table 2.

Severe dysentery with ulcerated colonic mucous membranes yielding smears positive for E. histolytica were noted in four patients. In two of these (5 and 16), retention enemas of carbarsone were administered with apparent benefit. A cleansing alkaline enema was given about two hours after the evening meal. This was followed in an hour by a slowly administered retention enema of 2 Gm. of carbarsone in 200 cc. of a 1 per cent warm sodium bicarbonate solution, in which

15. This case was presented in detail before the sixtieth annual session of the California Medical Association, San Francisco, April 30, 1931, and reported by Drs. H. H. Anderson and A. C. Reed in California and Western Medicine, "Amebiasis: Case Comparing Various Amebacides," December, 1931.

the drug will dissolve. This may be repeated every other night for five times unless meanwhile the dysentery subsides. During such administration, carbarsone should not be given by mouth for fear of too great arsenic absorption.

It is quite likely that one may find the course of carbarsone therapy as recommended (0.25 Gm. twice daily for ten days in the average adult) not adequate in a severe infestation with E. histolytica. We would suggest that the course of treatment be repeated in ten days if the stools fail to clear. The arsenic in carbarsone is not very rapidly eliminated after absorption,[12] and care must be taken not to induce arsenic toxicity. The course of treatment as recommended is well within the limits of tolerance we believe for the average patient, but we would not advise a larger dosage, except on the basis of body weight. The average total dose in our forty patients here reported was about 75 mg. per kilogram, given in divided doses over at least a ten day period without any evidence of toxicity.

TABLE 4.—*Some Data on Response to Carbarsone in Nonhistolytica Cases* *

Name	Age	Sex	Weight, Kg.	Carbarsone, Gm.	Duration of Treatment		E. coli	E. nana	Chilomastix	Iodameba buetschlii	Diendameba fragilis	Giardia	Chief Complaint	Duration	Associated Diagnosis	Other Conditions	Symptom Response
A. R. D.	42	♀	58.1	5.0	10 days	a	+	+	+	0	0	+	None	.....	Retroverted uterus and lacerated perineum	None	.....
						b	0	0	0	0	0	+					
F. R. D.	17	♂	78.1	5.0	10 days	a	+	+	0	0	0	0	None	.....	None	None	.....
						b	0	0	0	0	0	0					
P. R. D.	9	♂	34.7	3.0	6 days	a	+	0	+	0	0	0	None	.....	Internal squint	None	.....
						b	0	0	0	0	0	0					
W. R. D.	7	♀	23.5	2.0	8 days	a	+	+	+	0	0	0	None	.....	Carious teeth	None	.....
						b	+	+	+	0	0	0					
T. R. B.	51	♀	55.0	5.0	10 days	a	+	+	0	+	0	0	Symptoms of respiratory distress	5 years	Pulmonary tuberculosis	Secondary anemia	Good to the regimen
						b	0	0	0	0	0	0					
J. B. P.	41	♀	62.7	5.0	10 days	a	0	0	+	0	0	0	"Neuritis"	2 years	Chronic arthritis	None	None
						b	0	0	0	0	0	0					
J. W.	32	♂	60.0	5.0	10 days	a	0	0	0	0	+	0	Abdominal pain	4 months	None	None	Good
						b	0	0	0	0	0	0					
L. B. J.	36	♂	59.0	5.0	10 days	a	+	0	0	0	0	0	Emesis	7 months	None	None	Good
						b	0	0	0	0	0	0					
E. R. F.	50	♂	54.0	4.0	10 days	a	+	0	0	0	0	0	Dysentery	3 months	Bacterial colitis	Ulcerated mucous membrane of rectum	Good
						b	0	0	0	0	0	0					
R. R. M.	50	♂	63.0	5.0	10 days	a	+	0	0	0	0	0	None	.....	Dupuytren's contractures	None	.....
						b	0	0	0	0	0						

* a denotes before treatment; b, during three months follow-up.

There is no clinical evidence in our studies so far to indicate that carbarsone may be of prophylactic value in amebiasis. While we do not know how much of the drug was actually taken by the three noncooperative patients (34, 35 and 36), whose stools were only temporarily cleared of E. histolytica, it was obviously not enough to bring about a "cure" under the conditions of constant exposure to reinfection. Larger total doses of carbarsone than usual were given to three patients (16, 29 and 31) in the effort to prevent reinfection in an environment favoring such a possibility. We were unable to observe one (29) for longer than one month after stopping treatment, but in the other two (16 and 31) stools have remained free from E. histolytica for eight and five months, respectively, after cessation of therapy.

Our general impression (immodest though excusable) is that carbarsone is a valuable contribution to the treatment of amebiasis. It is obvious that better arsenical compounds than acetarsone ("stovarsol") for antiamebic use are relatively easy to find. More closely than any other antiamebic drug now exploited does carbarsone meet the requirements we proposed for an ideal agent in this regard. It is clinically effective without adjuvants under relatively rigorous criteria of cure; it is clinically nontoxic in effective doses; its use does not interfere with the ordinary routine of the patient; it may be administered conveniently by mouth; it apparently has no untoward side actions, and, very importantly, it may be marketed much more cheaply than any other antiamebic drug now in use.

SUMMARY

With rigorous but arbitrary clinical criteria of "cure," forty unselected amebiasis patients were treated with a high degree of success by "carbarsone," a drug, 4-carbamino-phenyl arsonic acid, containing 28.8 per cent of arsenic. The recommended dosage is 75 mg. per kilogram in divided amounts over at least a ten day period, since the arsenic in the compound seems rather slowly absorbed and eliminated after oral administration. Practically this dosage amounts in the average adult to 0.25 Gm. twice daily for ten days, given in gelatin capsules by mouth. It should not be used in amebic hepatitis, or in amounts which might cause symptoms of arsenic toxicity.[16]

More closely than any other drug now exploited does carbarsone meet the requirements of an ideal antiamebic agent. It is clinically nontoxic in effective doses; it may conveniently be administered orally without interference with the patient's usual routine; it has no untoward side actions, and it is comparatively cheap. There is no evidence as yet that it may be of prophylactic value.

16. At the time the proof was corrected, 175 amebiasis patients had been treated with carbarsone under our direction. Of these, five were not cleared by the first course of treatment. Local gastric irritation was observed in nine patients, all of whom received carbarsone from a lot purified by a method similar to that used in the purification of tryparsamide. This lot was found to contain a slightly higher percentage of arsenic than the original lots employed clinically, but no detectable differences in toxicity could be demonstrated in animals. The symptoms of local gastric irritation immediately subsided on stopping administration of this lot. This batch of carbarsone was immediately withdrawn from use and only such carbarsone is now being employed as has been purified according to the methods used in the original lots, which did not cause local irritation or any other type of toxic reaction.

CHEMOTHERAPY OF AMEBIASIS *

CHAUNCEY D. LEAKE, PH.D.
SAN FRANCISCO

The growing appreciation of the incidence of amebiasis, the wide variety of chemicals suggested for its relief or "cure," and the frequent disappointments of treatment justify a systematic investigation of its chemotherapy. The compounds so far proposed for treatment may be grouped as follows: (*a*) alkaloids, such as those of ipecac or of kurchi; (*b*) organic arsenicals, such as acetarsone ("Stovarsol"); (*c*) oxyquinoline derivatives, such as chiniofon ("Yatren"), and (*d*) miscellaneous antiseptics and astringents, such as the alkyl resorcinols and the bismuth compounds. It is surprising that no judicious survey has ever been attempted of the many types of drugs suggested for the treatment of amebiasis. Few of the agents exploited for use in this condition have sufficient experimental background to justify even controlled clinical trial in human beings,[1] let alone widespread and routine use under the pressure of skilful publicity.

Quantitative methods for the experimental evaluation of substances offered for the treatment of amebiasis are difficult to devise or to standarize. In compounds in which my associates and I have been interested, we have made quantitative estimations of the lethal range on oral administration in several genera of mammals and have studied the pathologic effects of toxic doses. We have quantitatively estimated their amebacidal action in vitro by a special technic, and we have judged their curative range in natural balantidial infestations in guinea-pigs and in natural amebic infestations in monkeys. We have studied the effects of proposed therapeutic doses in normal human volunteers, on whom we have also estimated the rate of excretion. With such an experimental background, certain chemicals of promise, which can be marketed reasonably, may be studied clinically under controlled conditions. Of some forty new compounds which we have investigated in this manner in comparison with well known drugs, two have come to clinical trial at our hands, and a third elsewhere.

My purpose in this report is to present a brief review of some of this work. It is desired not so much to call attention to specific drugs that may be recommended but rather to indicate the types of chemical groups within which further intensive study may reveal specific compounds approaching an ideal drug for use in amebiasis. This should, of course, definitely and promptly rid the host of Endamoeba histolytica; it should be effective at a low dosage, relative both to the single dose or to the total amount on repeated administration which might cause symptoms of acute or chronic toxicity, respectively; it should relieve any symptoms of amebiasis; it should be able to reduce the probability of infection; it should be of such low toxicity as to lead to no clinical damage or danger even on extensive use; it should be nonirritating; it should be absorbed and eliminated with fair rapidity; it should be stable and susceptible of oral administration; the course of treatment with it should interfere little, if at all, with the usual activity of the patients, and it should be reasonable in price. No existing drug is to be recognized at present as meeting these criteria.

The trouble in evaluating objectively the many drugs proposed for the treatment of this disease has been the lamentable lack of adequate quantitative data on their pharmacologic properties in comparison with chemically related agents, even for so relatively simple a matter as their toxicity. This has probably been due to too much uncritical commercial interest in certain compounds, at the expense of scientific fairness. Cooperation is cordially invited in the effort to correct this imbalance.

IPECAC AND KURCHI ALKALOIDS

Little promise of approaching the ideal is to be expected among the ipecac or kurchi alkaloids. The latter are not sufficiently effective, and the former are only partially effective in amounts which too often are dangerous.

In chronic amebic colitis, Acton and Chopra [2] found that 4 grains (0.26 Gm.) of kurchi bismuth iodide orally twice daily for ten days cured twelve of eighteen cases, but Reed [3] has given 0.5 Gm. daily for ten days to five chronic amebiasis sufferers without relieving symptoms or clearing their stools, even temporarily, of Endamoeba histolytica. Because of this relative clinical ineffectiveness, no experimental work on kurchi alkaloids has yet been done in the investigation here reviewed. Emetine and related compounds were studied, however, because of the general use of these drugs. Especial attention was paid to the toxicity of emetine.

As indicated in table 1, the lethal range (most readily expressed graphically by a curve relating percentage mortality to dosage in milligrams of drug per kilogram of body weight [4]) of emetine hydrochloride appears to be about the same for ordinary laboratory animals, no matter by what route administered, or whether given in one dose or in divided doses over a relatively long period. In such cases in human beings as have been adequately reported, toxicity seems also to have been encountered in this same range, around 25 mg. per kilogram.[5] These data indicate that emetine is detoxified or eliminated very slowly indeed and, in conjunction with experimental and clinical observations, they point to its "fixation" in some tissue of relatively the same functional significance in all genera, with perhaps quantitative morphologic damage, which, if extensive enough after a certain dosage, leads to such impairment of function that death may follow. Such pathologic injury has definitely been established in degeneration of cardiac tissue severe enough to account eventually for death in rabbits examined after repeated administration of doses of the drug comparable to those within the recommended therapeutic range.[6] Similar observations have been made in the case of emetine bismuth iodide, emetine antimony iodide, "Auremetine," and isoamyl cephaeline phosphate. Because of the marked toxic manifestations of these

* Read before the Section on Pharmacology and Therapeutics at the Eighty-Second Annual Session of the American Medical Association, Philadelphia, June 12, 1931.

* Based on part of a cooperative study between the Pharmacological Laboratory, University of California Medical School, and the Pacific Institute of Tropical Medicine, Hooper Foundation for Medical Research, University of California, San Francisco. This work was initiated by Dr. A. C. Reed, and has been conducted in part by Drs. H. H. Anderson, N. A. David and J. F. Rinehart and Miss D. A. Koch, and it has been supported in part by the Eli Lilly Company, Indianapolis, and the Ciba Company, Inc., New York.

1. Leake, C. D.: Pharmacologic Evaluation of New Drugs, J. A. M. A. **93**: 1632 (Nov. 23) 1929.

2. Acton, H. W., and Chopra, R. N.: Kurchi Bismuthous Iodide: Its Value in Treatment of Chronic Amebic Infections of the Bowels, Indian M. Gaz. **64**: 481 (Sept.) 1929.

3. Reed, A. C.: Personal communication to the author.

4. Burn, J. H.: The Errors of Biological Assay, Physiol. Rev. **10**: 146, 1930.

5. Levy, R. L., and Rowntree, L. G.: Toxicity of Various Commercial Preparations of Emetine, J. Pharmacol. & Exper. Therap. **8**: 120, 1916. Leibly, F. J.: Fatal Emetine Poisoning Due to Cumulative Action, Am. J. M. Sc. **179**: 834 (June) 1930.

6. Rinehart, J. F., and Anderson, H. H.: Effect of Emetine on Cardiac Muscle, Arch. Path. **11**: 546 (April) 1931.

representative ipecac alkaloids in doses estimated to be required for effectiveness, there seems little hope of finding in this group the ideal drug. Support for this opinion may be found in the exhaustive study made by Dobell,[7] showing the effectiveness of emetine bismuth iodide in monkey amebiasis but at such necessarily large doses that toxic symptoms were encountered in 80 per cent of the treated animals. While emetine or its derivatives cannot be recommended for general or routine use on the basis of present experimental evidence, these drugs may retain a valuable place in the treatment of

TABLE 1.—*Summary of Published Data on Quantitative Toxicity of Emetine Hydrochloride*

Mode of Administration	Average Lethal Dose, Mg. per Kg.	References
Single intravenous in cats	6 to 16	Levy, R. L., and Rowntree, L. G.: J. Pharmacol. & Exper. Therap. **8**: 120, 1916
Divided intramuscular in rabbits, 1 mg. per Kg. daily	10 to 12	Chopra, R. N.; Gosh, B. N., and De, P.: Indian M. Gaz. **59**: 338 (July) 1924
Single subcutaneous in rabbits	10	Walters, A. L., and Koch, E. W.: J. Pharmacol. & Exper. Therap. **10**: 73 (July) 1917
Single subcutaneous in rabbits	14	Rogers, L.: Indian M. Gaz. **49**: 85, 1914
Single subcutaneous in rabbits	20	Vedder, E. B.: J. A. M. A. **62**: 501 (Feb. 14) 1914
Single subcutaneous in rabbits	20 to 25	Lake, G. C.: Bull. 113, Hyg. Lab. **2**: 41, 1918
Single subcutaneous in rats	15 to 20	Lake, G. C.: Bull. 113, Hyg. Lab. **2**: 41, 1918
Single subcutaneous in monkeys	14	Rogers, L.: Indian M. Gaz. **49**: 85, 1914
Divided subcutaneous in rabbits, 3 to 4 mg. per Kg. daily	21 to 44	Levy, R. L., and Rowntree, L. G.: J. Pharmacol. & Exper. Therap. **8**: 120, 1916
Divided subcutaneous in rabbits, 1 to 5 mg. per Kg. daily	21 to 25	Walters, A. L., and Koch, E. W.: J. Pharmacol. & Exper. Therap. **10**: 73 (July) 1917
Divided subcutaneous in cats, 2 to 5 mg. per Kg. daily	14 to 55	Levy, R. L., and Rowntree, L. G.: J. Pharmacol. & Exper. Therap. **8**: 120, 1916
Single oral in rabbits	15 to 20	Anderson, H. H., and Leake, C. D.: Am. J. Trop. Med. **10**: 249 (July) 1930
Single oral in cats	15 to 20	Anderson, H. H., and Leake, C. D.: Am. J. Trop. Med. **10**: 249 (July) 1930

amebic hepatitis, in which other types of chemicals, apparently better indicated for chronic amebiasis, have too deleterious an effect on the liver. But even in the restricted indication of emetine for amebic hepatitis it would seem wise, in applying present knowledge of its toxicity to clinical practice, to use a dosage based on body weight, not giving a larger single dose (of the hydrochloride) than 1 mg. per kilogram nor more than a total of 10 mg. per kilogram. This was practically recommended by Vedder [8] in stating that a total of 10 grains (0.65 Gm.) should not be exceeded in the average human adult.

MISCELLANEOUS ASTRINGENTS AND ANTISEPTICS

In spite of the great clinical success of James [9] with bismuth subnitrate, an experimental evaluation of bismuth salts in comparison with other amebacides has not yet been made in accordance with the sort of study here outlined. Certainly these compounds deserve consideration.

Again, although certain acridines, especially 2-ethoxy-6:9-diamino acridine ("Rivanol"), have been recommended by Wagner [10] and Peter [11] as useful amebacides, they have not been included in the studies here reported, because of the difficulty of procuring them in amounts adequate to attempt a confirmation of these claims. Since the clinical effectiveness of "Rivanol" has been shown by the careful work of Biggam [12] to be negligible, such an effort would seem of little significance anyway.

Since Faust [13] has offered evidence that heptyl resorcinol is very successful clinically in amebiasis, it is important to compare it experimentally with other alkyl resorcinols, in particular hexyl resorcinol, to determine whether it really gives promise of being the best of the group for the purpose. Unfortunately, only hexyl, heptyl, and octyl resorcinol seem readily available for such a study. The toxicity of these drugs on oral administration appears to increase with increase in size of the alkyl radical.[14] But octyl resorcinol may definitely be ruled out of further study because of its severe locally irritating properties. In natural balantidial infestations in guinea-pigs, heptyl resorcinol was found to be definitely curative, but in doses which too often caused death.[15] Further laboratory investigation of these drugs is desirable. Because of the reputed superiority of hexyl resorcinol over the other alkyl resorcinols as an antiseptic, and because it is less toxic than heptyl resorcinol, it would seem that heptyl resorcinol must definitely be shown by every available method to be better than hexyl resorcinol in amebiasis or else be dropped from further consideration.

TABLE 2.—*Summary of Some Experimental Data on Certain Halogenated Oxyquinolines*

Drug	Mortality Ratio and Single Oral Lethal Dose in Guinea-Pigs, Mg. per Kg.	Amebacidal Concentration in Vitro at 24 Hours	Divided Oral Balantidicidal Dose in Guinea-Pigs, Mg. per Kg.	Effects in Naturally Infested Monkeys
Oxyquinoline sulphate	1/10 at 1,200	1:10,000	No cures at 1,250	.....
Chloroxyquinoline	5/15 at 1,200	1:10,000	.....	Ineffective at 100 mg. per Kg. in 5 doses in 10 days
Sodium-iodoxyquinolinesulphonate (chiniofon)	7/15 at 900	1:500	60% cured at 600 with 20% mortality; 60% cured at 900 with 40% mortality	2 died at 2 Gm. daily for 10 days; 2 cured at 0.5 Gm. daily for 28 days (Kessel, J. F.: Univ. Calif. Pub. Zool. **31**: 275, 1928, and personal communication)
Iodochloroxyquinoline (vioform)	13/20 at 200—	1:10,000 (for sol. HCl of basic ether)	80% cured at 150 with 20% mortality	7/8 cured of E. histolytica at 100 mg. per Kg. every 2 or 3 days for 10 doses (1,000 mg. per Kg. in 3-6 weeks), with no untoward effects

HALOGENATED OXYQUINOLINES

Since its clinical introduction by Mühlens [16] sodium-iodoxyquinolinesulphonate (Chiniofon, N. N. R.) has been popular as a relatively nontoxic and supposedly efficient amebacide. In this survey it has been com-

7. Dobell, C., and Bishop, A.: The Action of Emetine on Natural Amebic Infections in Macaques, Parasitology **21**: 446, 1929.
8. Vedder, E. B.: Origin and Status of Emetine Treatment of Amebic Dysentery, J. A. M. A. **62**: 501 (Feb. 14) 1914.
9. James, W. M., and Deeks, W. E.: The Etiology, Symptomatology and Treatment of Intestinal Amebiasis, Am. J. Trop. Med. **5**: 97 (March) 1925.
10. Wagner, O.: Untersuchungen über die experimentelle chemotherapie der Amöbenruhr, Beihefte z. Arch. f. Schiffs- u. Tropen-Hyg. **32**: 159, 1928.
11. Peter, F. M.: Rivanol in der Behandlung der Amöbendysenterie, München. med. Wchnschr. **74**: 1709 (Oct. 7) 1927; Arch. f. Schiffs- u. Tropen-Hyg. **32**: 176, 1928.
12. Biggam, A. G., and Arafa, M. A.: The Effect of Rivanol in the Treatment of Amebic Dysentery, Lancet **1**: 1335 (June 21) 1930.
13. Faust, E. C.: Effect of Di-Hydranol on Intestinal Protozoa of Man and Laboratory Animals, Proc. Soc. Exper. Biol. & Med. **27**: 905 (June) 1930.
14. Anderson, H. H.; David, N. A., and Leake, C. D.: Oral Toxicity of Certain Alkyl Resorcinols in Guinea-Pigs and Rabbits, Proc. Soc. Exper. Biol. & Med. **28**: 609 (March) 1931.
15. David, N. A., and Leake, C. D.: Toxicity and Balantidicidal Action of "Di-Hydranol" in Guinea-Pigs, Proc. Soc. Exper. Biol. & Med. **28**: 196 (Nov.) 1930.
16. Mühlens, P., and Menk, W.: Ueber Behanglungsversuche der chronischen Amöbenruhr mit Yatren, München. med. Wchnschr. **68**: 802 (June 30) 1921.

pared in the laboratory with certain available related compounds,[17] with the results that have been summarized in table 2. These indicate that at least one of the higher halogenated oxyquinolines gives promise of being much superior in amebiasis than this agent.

Iodochloroxyquinoline (Vioform, N. N. R.) seems rapidly excreted in the urine in human beings, is nonirritating when given in capsules by mouth, and no untoward symptoms from its continued administration (250 mg. thrice daily for ten days) have occurred in amebiasis patients volunteering to take it. It seems more specifically effective against E. histolytica than against other intestinal protozoa;[18] in monkey amebiasis it is the most satisfactory of many promising drugs studied, including the common amebacides, in consistently, promptly and fully eradicating amebas, in small doses at intervals of two or three days over a relatively long period. In rabbits killed by air injection after being given divided doses in the sublethal range (100 mg. per kilogram daily for five to ten days), no demonstrable tissue injury of any sort was noticed on histologic postmortem examination, but similar study on animals dying from single lethal doses of the drug (250 mg. per kilogram) revealed liver damage. This would suggest caution in using the drug in the presence of liver disease. Investigation of this drug and of a large series of other halogenated oxyquinoline derivatives is in progress.

ORGANIC ARSENICALS

The success of Ehrlich and Hata's chemotherapeutic studies on organic arsenicals in syphilis naturally would suggest interest in this type of compound in other protozoan diseases, irrespective of the mooted question whether such substances act in a direct protozoacidal manner or by promoting tissue resistance to the invading organism. Stimulated by the oral use of 3-acetyl-amino-4-hydroxy-phenyl arsonic acid (Acetarsone N. N. R., "Stovarsol") in syphilis, as developed by Fourneau,[19] Marchoux[20] seems to have been the first (1923) to employ an organic arsenical by mouth in amebiasis. He found acetarsone effective. Since then, this drug has enjoyed some popularity as an amebacidal agent, but no special chemotherapeutic studies in this regard seem to have developed from it, except that the related compound 3-formylamino-4-hydroxyphenyl arsonic acid ("Treparsol") has been used,[21] but without arousing much attention.

In the work reported here, two types of organic arsenicals were studied in comparison with acetarsone: one a series of *p*-amino arsonic acids, represented by 4-carbamino phenyl arsonic acid, $AsO_3H_2.C_6H_4.NHCONH_2$, (called "Carbarsone" for convenience) and tryparsamide, $AsO_3HNa.C_6H_4.NHCH_2CONH_2$, and the other a series of arsenious trithio compounds, represented by arsenious trithio salicylic acid, $As(S.C_6H_4.COOH)_3$.

Some of the data secured are summarized in table 3, but they are hard to evaluate. It is clear, however, that one may expect to find better organic arsenicals for use in amebiasis than acetarsone. Acetarsone is too toxic in doses necessary for effectiveness.[22] Judgment is reserved on the arsenious trithio compounds. More study is necessary to estimate properly their possible merits. They are cumulatively toxic but apparently quite active. Of the *p*-amino arsonic acid series, the propionamide and the butyramides are not readily available, and tryparsamide does not seem sufficiently effective. Thiocarbarmino-phenyl arsonic acid, $AsO_3H_2.C_6H_4.NHCSNH_2$, differs from "Carbarsone" only in that an atom of sulphur replaces an atom of oxygen in the carbamino radical. But this replacement is accompanied by reduction in biologic activity,[23] the thio compound being much less toxic and amebacidal.

TABLE 3.—*Experimental Data on Certain Arsenical Drugs Studied from the Standpoint of Their Possible Usefulness in Amebiasis*

Drugs and Actual Arsenic Content of Sample Used		Average Lethal Dose on Single Oral Administration: Guinea-Pigs, Mg. per Kg.	Rabbits, Mg. per Kg.	Cats, Mg. per Kg.	Amebacidal Concentration in Vitro at 48 Hours	Total Balantidicidal Dose on Divided Oral Administration to Guinea-Pigs	Comment on Effects in Monkeys Naturally Infested with E. Histolytica
Sodium acetarsone	25.3%	100	100	125–150	1:600	75% cured at 150 with 50% mortality	Tolerate 400 mg. per Kg. at 30 mg. per Kg. daily, with slight effect
Carbamino-phenyl-arsonic acid	28.3%	150	200	200–250	1:4,000	80% cured at 120 with 20% mortality	Tolerate 700 mg. per Kg. at 30 mg. per Kg. daily, with symptomatic improvement and temporary clearing of amebae
Thio-carbamino-phenyl arsonic acid	18.7%	...	1,000	750	1:600	.....	.....
Tryparsamide	24.6%	125	200	...	1:1,000	100 (Sweeney, M. A.: Am. J. Hyg. 9: 544 (May) 1929	.....
Sodium phenyl-amino-proprionamide p-arsonate	26.0%	100	100	200–250	1:10,000	.....	Tolerate 800 mg. per Kg. at 50 mg. per Kg. daily, with slight effect
4-amino-isobutyramide phenylarsonic acid	26.5%	150	...	...	.....	.....	.....
4-amino-n-butyramide phenylarsonic acid	24.0%	100	50	...	.....	60% cured at 150 with 40% mortality	.....
Arsenious tri-thio-salicylic acid	13.6%	...	75–100	300	1:40,000	.....	Tolerate 40 mg. per Kg. at 8 mg. per Kg. daily with no effect; die at 80 mg. per Kg. with clearance of E. histolytica
Arsenious tri-thio-phenyl-sulphonic acid	11.6%	...	150	150–200	1:9,000	.....	Tolerate 50 mg. per Kg. at 10 mg. per Kg. daily with no effect; die at 100 mg. per Kg. with clearance of E. histolytica

17. Anderson, H. H.; David, N. A., and Koch, Dorothy A.: Effects of the Halogenation of Oxyquinoline on Biological Activity, Proc. Soc. Exper. Biol. & Med. **28:** 484 (Feb.) 1931.

18. Anderson, H. H., and Koch, Dorothy A.: Iodochloroxyquinoline (Vioform, N. N. R.) as an Amebacide in Macaques, Proc. Soc. Exper. Biol. & Med. **28:** 838 (May) 1931.

19. Fourneau, Ernest: Sur l'emploi de l'acide oxyaminophenylarsenique et des acides arylariniques en général dans le traitement spirilloses, Ann. de l'Inst. Pasteur **35:** 571 (Sept.) 1921.

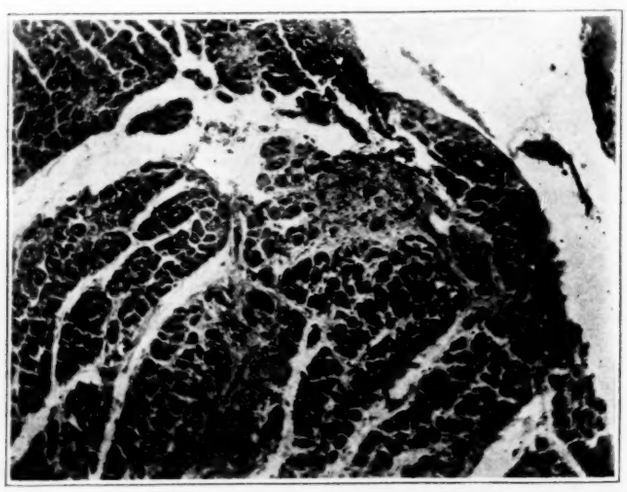
20. Marchoux, E.: Le stovarsol guérit rapidement la dysenterie amibienne, Bull. Soc. path. exot. **16:** 79, 325, 1923; Paris Méd. **2:** 421 (Nov. 22) 1924.

21. Flandin, C.: Le dérivé formylé de l'acid m-amino-p-oxyphenyl arsenique (tréparsol) dans la traitement de l'amibiase, Bull. et mém. Soc. méd. d. hôp. de Paris **48:** 1628 (Nov. 21) 1924.

22. Bender, W. L.: Stovarsol Poisoning, Am. J. M. Sc. **174:** 819 (Dec.) 1927.

23. Leake, C. D.; Koch, Dorothy A., and Anderson, H. H.: Effect on Biological Activity of Substituting Sulphur for Oxygen in an Organic Arsenical Compound, Proc. Soc. Exper. Med. & Biol. **27:** 717 (May) 1930.

While carbarsone was found ineffective in monkey amebiasis so far as clearing the stools of cysts of E. histolytica was concerned, the general improvement of the animals under treatment with repeated small doses and the relative cheapness of the drug led to its consideration for human use. In normal subjects it was well tolerated by mouth and was found to be excreted in the urine in about the same proportion and rate as acetarsone.[24] With minimal lethal doses of "Carbarsone" by mouth, animals may present symptoms of lethargy, loss of weight, abdominal distention, diarrhea, sluggish reflexes, and failure of the pupils to respond to light. Histologic examination of animals dying from minimal lethal doses revealed some evidence of renal necrosis with tubular degeneration. On repeated administration of doses within the therapeutic range, no toxic symptoms were noted, and on microscopic examination in these animals killed by air injection, no tissue injury was found. Since the drug contains a modified amino group in the para position to the arsenic and hence may be found to injure the optic tract,[25] its use in human beings should proceed cautiously until it is established whether such injury is likely at therapeutic doses.



Fibrous cellular scars in heart muscle of a rabbit receiving orally 5 mg. per kilogram of emetine hydrochloride every third day for three doses, totaling 15 mg. per kilogram. The animal died ten days after the last dose. Note the resemblance to the pathologic picture in chronic stages of rheumatic fever. Reduced from a photomicrograph with a magnification of 175 diameters.

Clinical use of "Carbarsone" [26] in chronic amebiasis was inaugurated at a dosage of 250 mg. in gelatin capsules, twice daily for ten days. Of thirty-three patients, who have had adequate stool examinations at frequent daily intervals for a three months follow-up period after cessation of treatment, the stools have completely and consistently been free of E. histolytica in thirty cases, with prompt relief from symptoms and general improvement in physical condition and without any untoward effect whatever.[27] The three patients in whom E. histolytica recurred in the stools after temporary clearance were not cooperative, may not have taken the full dose of the drug, and were exposed to constant reinfection. It is noteworthy that the drug should appear so promising on clinical trial in human beings. The facts so far obtained warrant its thorough and controlled clinical study.

24. Chen, M. Y.; Anderson, H. H., and Leake, C. D.: Rate of Urinary Excretion After Giving Acetarsone ("Stovarsol") and "Carbarsone" by Mouth, Proc. Soc. Exper. Biol. & Med. **28**: 145 (Nov.) 1930.

25. Young, A. G., and Loevenhart, A. S.: Relation of Chemical Constitution of Certain Organic Arsenical Compounds to Their Action on the Optic Tract, J. Pharmacol. & Exper. Therap. **23**: 107 (March) 1924.

26. "Carbarsone" is a convenient name for 4-carbamino-phenyl arsonic acid, described in U. S. patent number 937929 issued to P. Ehrlich and A. Bertheim in 1909. It is a white crystalline solid, stable in air, without odor or taste, which in the anhydrous state should contain 28.85 per cent of arsenic. It is practically insoluble in water but dissolves in alkaline aqueous solutions, and it melts at 174 C. It has been furnished for this study by the Lilly Research Laboratories, Indianapolis.

27. Reed, A. C., and Anderson, H. H.: Personal communication to the author.

SUMMARY

Amebiasis, like syphilis, is a protozoan infection in which a variety of unrelated chemicals have some effectiveness, often difficult to estimate quantitatively by laboratory experimentation. To determine the indications of different groups of such agents for the many phases of the disease is a clinical problem. Laboratory studies, such as here reviewed, may aid in pointing out the groups of drugs that give most promise of general usefulness and in determining which individual compound of a related series approaches most closely a definable ideal. Quantitative experimental methods in this field are hard to standardize but, in agreement with Dobell,[7] effectiveness in monkey amebiasis may be said to be the best laboratory criterion, if taken in conjunction with quantitative toxicity and pathologic studies.

The evidence here presented indicates little hopefulness of finding an ideal agent among the kurchi or ipecac alkaloids, since the former seem too ineffective and the latter too dangerous in effective doses. Insufficient data are at hand to evaluate properly the place of the alkyl resorcinols in the therapy of amebiasis, but they deserve full investigation. As a result of their clinical success, bismuth salts also merit attention. Even a hurried experimental survey of the halogenated oxyquinolines indicates that at least one other compound in this group (iodochloroxyquinoline, or Vioform, N. N. R.) is likely to prove much better in amebiasis than the only one of the series so far attracting attention (sodium-iodoxyquinolinesulphonate, or Chiniofon, N. N. R.). Indeed, vioform is the most efficient drug of any type examined so far in monkey amebiasis, and there is no indication of toxicity in its therapeutic range. Likewise, among the organic arsenicals it is obvious that experimental search already reveals compounds of this type better than the only one in the group (acetarsone) so far awarded clinical consideration. Indeed, controlled clinical trial of 4-carbaminophenyl-arsonic acid ("Carbarsone"), based on fair preliminary experimental data, indicates its superiority to any amebacide in ordinary use, especially in its marked effectiveness in nontoxic doses. In comparison with other chemical types of amebacides, the organic arsenicals are significant in manifesting a general "tonic" effect, difficult to evaluate experimentally but clearly evidenced clinically. But they may exhibit toxic effects which make it expedient to employ them cautiously.

Third and Parnassus avenues.

ABSTRACT OF DISCUSSION

DR. MARK S. DOUGHERTY, JR., Atlanta, Ga.: The widespread incidence of amebiasis throughout this country is a well established fact. In a survey of the South for 1928 I reported 228 cases of amebiasis. During the past three years in Georgia I have treated twelve persons with clinical amebiasis in whom the vegetative forms of the endameba were demonstrated in the stool. Most of the patients were treated in hospitals. One grain (0.065 Gm.) of emetine hydrochloride was given intramuscularly daily for eight days. Beginning the first day

of treatment 16 grains (1 Gm.) of chiniofon was given three times a day for seven days and repeated in the same dosage after a week's interval. All the patients were clinically relieved and amebas were not found in the stool following treatment. However, in the twelve cases reported there was a recurrence of amebic diarrhea within eighteen months in three cases and Endamoeba histolytica was found in the stools again. Whether these recurrences were due to a failure to eradicate the original infection or whether they resulted from a reinfection, I am unable to say. This experience in a well controlled group of cases emphasizes anew the fact that amebiasis is a disease which tends to chronicity and that the complete eradication of the infection is by no means an easy task.

DR. CHAUNCEY D. LEAKE, San Francisco: The recurrence of infection is, as I understand it, the difficulty in the clinic. That is why I feel that one of the ideal requisites for a satisfactory drug in this condition is one that will reduce the probability of reinfection. It is there I think that this tonic effect, that is difficult to evaluate in the arsenicals, may be an important factor in connection with the judgment on these compounds.

RELATIONSHIP OF VITAMIN A TO RESPIRATORY INFECTIONS IN INFANTS *

L. H. BARENBERG, M.D.
AND
J. M. LEWIS, M.D.
NEW YORK

During the past year or more, increasing emphasis has been laid on the rôle of vitamin A in the prevention of infection. Some physicians are of the opinion that this vitamin protects infants and young children against infections of the respiratory tract. Such statements naturally have been made use of by pharmaceutic concerns, which have stressed the anti-infective value of their vitamin-A-containing products in medical journals as well as in magazines for the laity. This contention is based principally on carefully conducted animal experiments carried out in the course of the investigations of McCollum,[1] Drummond,[2] Osborne and Mendel,[3] Daniels and her associates,[4] Steenbock, Sell and Buell,[5] Sherman and Munsell,[6] Wolbach and Howe,[7] and Green and Mellanby.[8] These investigators have shown that in rats receiving diets devoid of vitamin A there almost invariably develop multiple infections, to which they eventually succumb. The most frequent sites of these infections are the conjunctivae, base of the tongue, genito-urinary tract, middle ear, nasal sinuses, bronchi and lungs. The administration of a food containing vitamin A, if given soon after the development of infection, brings about rapid cure. The susceptibility of animals to infection has been ascribed by Wolbach and Howe to a characteristic metamorphosis of the mucous membranes into keratinized stratified squamous epithelium, which is much less resistant to invasion by micro-organisms. Recent evidence has been brought forth by Lassen [9] and by Bradford,[10] indicating that the general resistance of the body is also affected as a result of vitamin A deficiency. These investigators injected pathogenic organisms subcutaneously or intraperitoneally into rats suffering from vitamin A deficiency and found a higher mortality in animals receiving a diet devoid of vitamin A as compared with those similarly inoculated but receiving an adequate diet. It should, however, be emphasized that these animals received no vitamin A whatever in their diet and exhibited the other characteristic manifestations of vitamin A deficiency; namely, failure to gain weight, and xerophthalmia. It should be mentioned, however, that recently Boynton and Bradford [11] have shown in experiments on rats that susceptibility to infection is a very early sign of deficiency of vitamin A, even preceding cessation of growth and xerophthalmia.

In contrast to the unanimity of opinion as to the value of vitamin A in preventing infections in animals, its importance in this regard in human beings is questioned. Its causal relationship to infection in children was suggested by Bloch [12] as early as 1917. In that report he stated that children receiving a diet markedly deficient in vitamin A were susceptible to infections of the respiratory and genito-urinary tracts and that this susceptibility preceded the development of xerophthalmia, which must be regarded as a comparatively late symptom. In 1928, Bloch [13] reported on the comparative incidence and severity of infections in children suffering from xerophthalmia or from scurvy. On account of the higher incidence and the greater severity of infections among the children suffering from xerophthalmia, he came to the conclusion that vitamin A alone is of specific importance in the resistance and the overcoming of infections. On the other hand, Spence [14] did not find any increase in systemic infections among seventeen cases of xerophthalmia which he observed in England; eleven of these patients were under 14 years, and the youngest was 2 years of age. There was a history of a deficient diet, little or no animal fat having been included. An investigation of the general health of the families of eleven patients showed that they had not suffered from any increased incidence of infection and did not give any indication of lowered resistance.

Mellanby [15] designates vitamin A as "the anti-infective vitamin." In a study of puerperal sepsis he treated fourteen cases with vitamin A concentrate, with a mortality of 28.6 per cent as compared with a mortality of 92 per cent among twenty-two untreated cases of the previous year and believed that vitamin A increased the resistance of the body to this form of sepsis. This encouraging report attracted widespread attention but is open to the criticism, pointed out in an editorial in THE JOURNAL,[16] that the treated cases seemed less fulminating at the outset than those which were not treated, which might explain the lower mor-

* From the Home for Hebrew Infants, service of Dr. Alfred F. Hess.

1. McCollum, E. V.: The Newer Knowledge of Nutrition, New York, Macmillan Company, 1918.
2. Drummond, J. C.: Researches on the Fat-Soluble Accessory Substance, Biochem. J. **13**: 95, 1919.
3. Osborne, T. B., and Mendel, L. B.: Ophthalmia and Diet, J. A. M. A. **76**: 905 (April 2) 1921.
4. Daniels, Amy L.; Armstrong, Margaret E., and Hutton, Mary K.: Nasal Sinusitis Produced by Diets Deficient in Fat-Soluble A Vitamin, J. A. M. A. **81**: 828 (Sept. 8) 1923.
5. Steenbock, Harry; Sell, M. T., and Buell, M. V.: Fat-Soluble Vitamin, J. Biol. Chem. **47**: 89 (June) 1921.
6. Sherman, H. C., and Munsell, H. E.: The Quantitative Determination of Vitamin A, J. Am. Chem. Soc. **47**: 1639, 1925.
7. Wolbach, S. B., and Howe, P. R.: Tissue Changes Following Deprivation of Fat-Soluble A Vitamin, J. Exper. Med. **42**: 753 (Dec.) 1925.
8. Green, H. N., and Mellanby, Edward: Vitamin A as an Anti-Infective Agent, Brit. M. J. **2**: 691 (Oct. 20) 1928.
9. Lassen, H. C. A.: Vitamin A Deficiency and Resistance Against Specific Infection, J. Hyg. **30**: 300 (Aug.) 1930.
10. Bradford, William: The Relationship of Deficiency of Vitamin A and D to Infection, Am. J. Dis. Child. **40**: 695 (Sept.) 1930.
11. Boynton, L. C., and Bradford, W. L.: Effect of Vitamins A and D on Resistance to Infection, J. Nutrition **4**: 323 (Sept.) 1931.
12. Bloch, C. E.: Ugesk. f. læger. **79**: 309 (March 1) 1917.
13. Bloch, C. E.: Decline in Immunity as a Symptom Due to Deficiency in A Vitamin and in C Vitamin, Acta Paediat. **7**: 61 (supp. 2) 1928.
14. Spence, J. C.: Tr. Second International Pediatric Congress, Copenhagen, 1930, p. 541.
15. Mellanby, Edward: The Relation of Diet to Health and Disease, Brit. M. J. **1**: 677 (April 12) 1930.
16. Vitamin A in Disease, editorial, J. A. M. A. **95**: 798 (Sept. 13) 1930.

tality rate. Burton and Balmain [17] as well as Cramer [18] did not share this favorable outlook in regard to puerperal sepsis. In regard to the relationship of nutrition to respiratory infection in infants, Clausen [19] believes that the severity of infection depends on a number of dietary factors, among which vitamin A stands out rather conspicuously.

At present there is considerable discussion as to the relative merits of cod liver oil and of viosterol. The content of vitamin A in cod liver oil is considered by many as offering a distinct advantage in favor of this antirachitic agent over viosterol—not that this nutritional factor gives to the oil greater antirachitic potency, but that the content of vitamin A has the effect of reducing the incidence of respiratory infections among infants and young children. If this is true, one must conclude that most infants and young children are suffering from a deficiency of vitamin A, in spite of receiving liberal quantities of milk and vegetables, which are rich sources of this factor. It has also been intimated that cod liver oil may contain some other factor apart from vitamin A that may be of importance in protecting against infection.

During the winter months, the prevalence of infections of the respiratory tract constitutes the greatest problem in child-caring institutions. In this institution in the course of the past few years, many and various attempts have been made to reduce the incidence of these infections. In 1925, a series of infants were systematically exposed to the radiations of the mercury vapor quartz lamp, and in 1926 to those of the carbon arc lamp, but as reported in THE JOURNAL,[20] we were unable by this means to reduce the number of infections. In 1928, "aseptic" nursing, in other words, nursing carried out with the greatest aseptic precautions, was instituted, but also without effect.[21] In 1929, in the course of a study of the relation of nutrition to infections of the respiratory tract,[22] it was found that those infants which had been protected against rickets were no less susceptible to pneumonia than those which had not been protected against this disorder. Thus the administration of vitamin D was of no value in preventing the development of pneumonia. It may be added that general nutrition, as determined by body weight, was found also to have no relationship to the occurrence of pneumonia.

The present study is purely clinical and was undertaken primarily to compare the incidence and severity of respiratory infections between infants receiving cod liver oil and those receiving viosterol. A comparison of the incidence and severity of infections was made for the year 1926, when cod liver oil was given as the antirachitic agent, and 1929, when viosterol was substituted. On account of the possibility that the genus epidemicus might not have been the same during these years and also in view of the recent favorable reports by reliable investigators of the anti-infective value of vitamin A, we decided to extend our observation under more controlled conditions. Accordingly, in the autumn of 1930, thirty-five infants ranging in age from 2 to 8 months were given 3 teaspoonfuls daily of standardized cod liver oil, and thirty-two of about the same age were given 20 drops of viosterol in oil 250 D. The diets of these infants were similar, consisting of pasteurized milk varying from 600 to 1,000 cc. daily, depending on the age, cereal at 4 months, butter, 10 Gm., at 6 months, and vegetables, 30 Gm., at 8 months. These two groups of infants were equally distributed in two wards, so that external factors such as exposure to infection, hygiene and nursing care were identical for the two groups. They were carefully observed throughout the winter and spring, the temperatures being taken three times a day. When the temperature rose above 100, a careful physical examination was made. Infections were classified as mild, moderate or severe, depending on the nature and duration of the illness. Purulent otitis media, mastoiditis and pneumonia were considered severe infections.

TABLE 1.—*Approximate Number of Vitamin A Units in Diets of the Four Groups of Infants*

Group	Under Six Months	Over Six Months
Partly skimmed milk	750	2,130
Viosterol	1,500	3,000
3 teaspoonfuls of cod liver oil	9,000	10,500
6 teaspoonfuls of cod liver oil	16,500	18,000

The scope of the investigation was further enlarged by testing the effect of maximum quantities of cod liver oil on the incidence of respiratory infections as well as, on the other hand, the effect of partly skimmed dried milk which, when reconstituted to its original volume, contained about 1.5 per cent fat; in other words, less than half the vitamin A content of whole milk. Thus this study comprised four groups: (1) cod liver oil, (2) viosterol, (3) maximum cod liver oil and (4) partly skimmed milk (irradiated).

The vitamin A content of food is expressed in terms of units per gram, a unit being defined, according to Sherman,[23] as that amount which, when fed daily to a rat on a vitamin A free diet, brings about an average gain of body weight of 3 Gm. a week during the test period of from four to eight weeks. Milk is a rich source of vitamin A as it contains 2 units per gram, or 2,000 units to the quart. As infants are given daily from a pint to a quart of milk, depending on age, they receive from 1,000 to 2,000 units in this food. Cereals are notably poor sources of this vitamin, whereas green vegetables, especially spinach and carrots, are very rich. Cod liver oil represents the richest source of vitamin A, each gram of high grade oil containing at least 500 units.

TABLE 2.—*Comparison of the Incidence and Severity of Respiratory Infections Among Infants (One to Eighteen Months) Receiving Cod Liver Oil or Viosterol*

	Year	Number of Infants	Average Period of Therapy, Months	Infection				Infections per Infant per Month	Incidence of Pneumonia per Month
				Number	Mild	Moderate	Severe		
Cod liver oil, 3 teaspoonfuls	1926	50	12.18	168	80	17	71	0.28	1.81
	1930	35	6.00	51	19	15	17	0.24	2.00
Viosterol 20 drops	1929	62	11.60	144	53	38	53	0.20	1.99
	1930	32	7.00	43	11	14	18	0.19	1.14

17. Burton, A. H. G., and Balmain, A. R.: Vitamin A and Streptococcal Antitoxic Immunity, Lancet **1**: 1063 (May 17) 1930.
18. Cramer, W.: Vitamin A and Infections, Lancet **1**: 1153 (May 24) 1930.
19. Clausen, S. W.: Influence of Nutrition upon Respiratory Infections of Infancy, New York State J. Med. **31**: 88 (Jan. 15) 1931.
20. Barenberg, L. H.; Friedman, Irving; and Greene, David: The Effect of Ultraviolet Irradiation on the Health of a Group of Infants, J. A. M. A. **87**: 1114 (Oct. 2) 1926. Barenberg, L. H., and Lewis, J. M.: The Effect of Carbon Arc Irradiation on the Health of a Group of Infants, ibid. **90**: 504 (Feb. 18) 1928.
21. Abramson, Harold; and Barenberg, L. H.: Respiratory Disorders in Infants, J. A. M. A. **92**: 2156 (June 29) 1929.
22. Barenberg, L. H.; Greene, David; and Abramson, Harold: The Relationship of Nutrition to Pneumonia in Infancy and Childhood, J. A. M. A. **92**: 440 (Feb. 9) 1929.
23. Sherman, H. C., and Smith, S. L.: The Vitamins, New York, Chemical Catalog Company, Inc., 1931.

An estimate was made of the vitamin A content of the diets which were given to the four groups of infants. It was found (table 1) that the vitamin content ranged from 750 to 18,000 units a day. The infants in the "partly skimmed milk group" received the smallest quota of vitamin A, those in the viosterol group a moderate amount, those receiving 3 teaspoonfuls of cod liver oil a large amount, and finally those receiving 6 teaspoonfuls of cod liver the largest amount of the vitamin. An excellent opportunity was afforded, therefore, of determining the relationship between the vitamin A content of diets and the incidence of infections of the respiratory tract among infants.

The results of the present study are clearly shown in table 2. During 1930 and 1931, in thirty-five infants receiving 3 teaspoonfuls of cod liver oil daily for an average period of six months, fifty-one respiratory infections developed, of which nineteen were mild, fifteen moderate and seventeen severe; the incidence of infection per infant monthly was 0.24. In thirty-two infants of the viosterol group, observed during the same period, forty-three infections developed, of which eleven were mild, fourteen moderate and eighteen severe, a rate incidence of 0.19 infection. Thus there was no significant difference in incidence or in severity of respiratory infections between infants which had been receiving cod liver oil and those which had been receiving viosterol. As a matter of fact, the number of infections of the respiratory tract was slightly less in the viosterol group, but the lower incidence in this group is probably a coincidence.

TABLE 3.—*Number of Infections in Relation to Age Among Infants Receiving Cod Liver Oil or Viosterol (1926, 1929, 1930)*

Age (Months)	Number of Infants		Average Period of Therapy, (Months)		Number of Infections		Infection per Infant per Month	
	Cod Liver Oil	Viosterol	Cod Liver Oil	Viosterol	Cod Liver Oil	Viosterol	Cod Liver Oil	Viosterol
0–3	27	47	2.0	1.7	8	7	0.14	0.08
3–6	61	75	2.4	2.5	29	21	0.19	0.11
6–9	64	88	2.6	2.8	56	56	0.33	0.22
9–12	57	78	2.7	2.8	59	58	0.38	0.26
12–15	48	65	2.7	2.5	31	33	0.24	0.20
15–18	37	43	2.5	2.1	16	19	0.17	0.21

In comparing the incidence of infections among infants receiving cod liver oil in 1926 with those receiving viosterol in 1929 (table 2), it was found that in the fifty infants of the cod liver oil group 168 infections developed, of which 80 were mild, 17 moderate and 71 severe, giving an incidence of 0.28 infection per infant monthly; the sixty-two infants receiving viosterol contracted 144 infections; 53 of these were mild, 38 moderate and 53 severe, an incidence of 0.2 infection per infant monthly. It will be noted that these results are similar to those obtained in 1930 and 1931 and indicate that cod liver oil has been of no value in reducing the incidence of infection of the respiratory tract among the infants of our institution.

It is believed by some physicians that cod liver oil prevents the development of complications in infections of the upper respiratory tract. With this in mind, we computed the number of cases of pneumonia among infants receiving cod liver oil or viosterol, and have included the data in table 2. It will be seen that in 1930 and 1931, of thirty-five infants receiving 3 teaspoonfuls of cod liver oil, twelve contracted pneumonia, giving an incidence of two cases of pneumonia a month, whereas of the thirty-two infants receiving viosterol, eight developed pneumonia, an incidence of 1.14. In 1926 the monthly incidence of pneumonia in the fifty infants of the cod liver oil group was 1.81; of the sixty-two infants in the viosterol group, 1.99. Cod liver oil, therefore, did not diminish the number of cases of pneumonia. It should be added that the administration of cod liver oil did not alter the course of the disease.

In carrying out a study of respiratory infections, the relationship of age to susceptibility to infection must be borne in mind. This point is brought out in table 3, which shows that fewer infections occur during the first six months of life and especially during the first three months. We do not know whether the low incidence at this age is due to lack of susceptibility or to the presence of immune bodies transferred from the mother. Analysis of this table reveals the fact that infants of these various age groups, with the exception of those from 15 to 18 months, had fewer infections when viosterol was given.

TABLE 4.—*Incidence of Infection in Relation to Season Among Infants Receiving Cod Liver Oil or Viosterol (1926, 1929, 1930)*

Season	Number of Infants		Average Period of Therapy, (Months)		Number of Infections		Infection per Infant per Month	
	Cod Liver Oil	Viosterol	Cod Liver Oil	Viosterol	Cod Liver Oil	Viosterol	Cod Liver Oil	Viosterol
April to June	66	88	2.9	2.8	45	44	0.23	0.18
July to September	94	72	2.4	2.0	43	22	0.19	0.15
October to December	92	103	2.4	2.7	74	46	0.33	0.17
January to March	71	113	2.2	2.7	55	74	0.35	0.25

The data in table 4 were collected to ascertain whether there was any distinction between the two groups when regarded and studied from the standpoint of season. As was expected, the incidence rose during the autumn and was highest during the winter months. Throughout the various seasons of the year fewer infections occurred among the infants receiving viosterol.

A small number of infants received partly skimmed dried milk (irradiated), and a few words in regard to our experiences with this small group may be of interest. During the years 1926, 1929 and 1930, nineteen infants received this milk, which had a fat content, when reconstituted to its original value, of about 1.5 per cent. Since vitamin A is present in the lipoid fraction only, this milk contained, as previously pointed out, less than half the vitamin A content of whole milk. These infants were observed for an average length of time of four and two-tenths months. During this period, sixteen infections of the upper respiratory tract occurred and the incidence of infections per infant monthly was 0.2. Thus, in spite of the reduction of vitamin A in the dietary, these infants were no more susceptible to

TABLE 5.—*Comparative Gain in Weight Among Infants Receiving Cod Liver Oil or Viosterol (1926, 1929, 1930)*

Viosterol, 20 Drops			Cod Liver Oil, 3 Teaspoonfuls		
Age in Months	Number of Infants	Average Gain in Weight per Month, Pounds	Age in Months	Number of Infants	Average Gain in Weight per Month, Pounds
0–3	10	1.89	0–3	6	1.25
3–6	44	1.29	3–6	33	1.18
6–9	69	1.04	6–9	51	0.98
9–12	69	0.70	9–12	52	0.81
12–15	49	0.23	12–15	42	0.46
15–18	34	0.37	15–18	36	0.46

infections than those receiving 3 teaspoonfuls of cod liver oil.

Six infants comprised the group which received maximum amounts of cod liver oil, 6 teaspoonfuls daily during the winter months of 1929. This large amount of oil was well tolerated, and in no instance was vomiting or diarrhea noted. The number of infections in these infants was twelve, of which six were mild and six severe, giving the high incidence of 0.43 infections per infant monthly. In three infants, pneumonia developed; two died. It is realized that six infants constitute a very small group and therefore that no sweeping deductions should be made from these observations. The results, however, were so striking that one relinquishes the hope of diminishing the incidence of respiratory infections or of preventing the development of pneumonia among infants by means of maximum quantities of vitamin A. This experience also controverts the idea that cod liver oil contains an unknown anti-infective factor quite apart from vitamin A.

Our results for the past few years should not be interpreted as indicating that no relationship exists between vitamin A and susceptibility to infection. There can be no doubt that a deficiency of one or more of the vitamins in the diet breaks down the natural resistance of the body and leads to infection. That such is the course of events was first shown by Hess,[24] in 1914, who described a ward epidemic of grip associated with the usual respiratory complications, which developed among infants as the result of latent scurvy. We agree with Bloch [13] that infants showing frank signs of vitamin A deficiency, such as failure to gain in weight, and xerophthalmia, are remarkably susceptible to infection. A few years ago we observed several children who were suffering from xerophthalmia, having received a proprietary preparation of milk which was almost devoid of vitamin A, and noted that the number of infections was high. Indeed, it is not necessary for infants to show frank manifestations of disease in order to be benefited by an addition of the various vitamins to their dietary. In the early days of the discussion of the specific nutritional factors, Hess drew the distinction between "nutritional disorders" and the far more frequent "disorder of nutrition." In connection with the present study it should be emphasized that our results are not applicable to infants receiving inadequate amounts of vitamin A in their dietary, for under such conditions fortifying the vitamin intake and thus rendering the dietary adequate may well have a beneficent and protective influence in regard to infection. It is difficult, if not impossible, to make a reliable statement in regard to the vitamin A requirement of the "average infant." Infants about 3 months of age receive approximately 720 Gm. (24 ounces) of milk; in other words about 1,500 units of this vitamin; when they reach the age of 6 months the quota of milk is generally increased and vegetables are added to the dietary. Whether such a regimen supplies an adequacy of vitamin A cannot be categorically stated. What does follow from our clinical experience is that the addition of cod liver oil to this type of dietary will not bring about increased protection against respiratory disease.

SUMMARY

The object of this investigation was to ascertain whether any relationship exists between the vitamin A content of the diet and the occurrence of respiratory infections. The incidence and severity of these infections were determined in four groups of infants, receiving various quantities of vitamin A in their diets. The first group comprised nineteen infants receiving partly skimmed milk; the second, ninety-four infants receiving pasteurized milk and 20 drops of viosterol; the third, eighty-five infants receiving pasteurized milk and 3 teaspoonfuls of standardized cod liver oil, and the fourth, six infants receiving pasteurized milk and 6 teaspoonfuls of cod liver oil. All infants were given orange juice at 6 weeks, butter at 6 months and vegetables at 8 months of age. Thus the four diets represented a small, a moderate, a large and a maximum amount of vitamin A. These infants were observed in an institution, for periods varying from four to twelve months. Respiratory infections were classified as mild, moderate or severe (purulent otitis media, mastoiditis and pneumonia being classed as severe infections).

The results may be summed up in a few words: No significant difference in incidence or severity of respiratory infections was noted in the four groups of infants. Thus the group which received the largest daily amount of vitamin A, through the addition of cod liver oil, was not protected against respiratory infections to a greater degree than were the other groups.

1749 Grand Concourse—495 West End Avenue.

24. Hess, A. F., and Fish, Mildred: Infantile Scurvy: The Blood, the Blood Vessels and the Diet, Am. J. Dis. Child. **8**: 386 (Dec.) 1914.

MACROCYTOSIS OF THE ERYTHROCYTES AND ACHLORHYDRIA IN PERNICIOUS ANEMIA*

RUSSELL L. HADEN, M.D.
CLEVELAND

MACROCYTOSIS OF THE ERYTHROCYTES IN PERNICIOUS ANEMIA

Hayem,[1] an early student of the morphology of the blood, found very large erythrocytes in a case of severe anemia. His patient, probably suffering from pernicious anemia, had 414,062 red cells per cubic millimeter of blood with a hemoglobin value of 554,840 normal cells and a color index of 1.34. Eichhorst,[2] who wrote the first monograph on pernicious anemia, thought curiously enough, that microcytosis was the most characteristic finding in this disease, and Quincke,[3] another early student, considered poikilocytosis a characteristic feature. In 1876, Sørensen [4] described the blood conditions in pernicious anemia and made the following statement:

> On the contrary, I find the considerable size of the blood corpuscles fairly characteristic for I have not observed such in other morbid conditions and this forms a contrast to what occurs in chlorosis where, as mentioned, I often met with blood corpuscles which were smaller than normal.

To Laache,[5] however, belongs the credit for emphasizing the constant occurrence of a high color index and of large corpuscles in the presence of pernicious anemia, and for correctly ascribing the increase in color index to the presence of many large cells. Ehrlich [6] stressed

* From the Cleveland Clinic.

* Read before the Section on Pathology and Physiology at the Eighty-Second Annual Session of the American Medical Association, Philadelphia, June 12, 1931.

1. Hayem, G.: Note sur l'action du fer dan l'anémie, Compt. rend. Acad. d. sc. **83**: 985-990, 1876.

2. Eichhorst, H.: Die progressive perniciöse Anämie, Leipzig, 1878, pp. 875.

3. Quincke, H.: Weitere Beobachtungen über perniciöse Anämie, Deutsches Arch. f. klin. Med. **20**: 1-31, 1877.

4. Sørensen, S. T.: Undersøgelser om Antallet af røde og livide Blodlegemer under forshjellegi physiologiske og pathologiske Tilstande, Copenhagen, 1876.

5. Laache, S.: Die Anämie, Christiania, 1883, pp. 276 and 278.

6. Ehrlich, Paul: Ueber einen Fall von Anämie mit Bemerkungen über regenerative Veränderungen des Knockenmarks, Charité-Ann. **13**: 300-309, 1888.

the importance of the appearance of megaloblasts in the circulating blood. Later workers have all accepted the opinion that the high color index is a characteristic feature of the blood in pernicious anemia, although some have interpreted this high color index as being due to an increased saturation of the cells with hemoglobin rather than to a macrocytosis of the erythrocytes.

In 1864, Welcker [7] calculated the volume of erythrocytes from measurements of their diameter and thickness and showed that in chlorosis the cells are smaller than normal. No measurements have been made in cases of pernicious anemia by Welcker's method. The early blood morphologists, in determining the size of erythrocytes, studied only the diameter of the red cells. Laache [5] measured with an ocular micrometer the cell diameter in the case of each of his patients with pernicious anemia. The invention of the hematocrit by Hedin,[8] in 1890, provided an instrument with which the volume of the cells could be accurately and easily determined. By means of the hematocrit, Capps [9] made a thorough study of the size of cells in various types of anemia and found that in pernicious anemia the volume index, which indicates the volume of the average cell relative to normal, was usually above 1.00, while in other types of anemia the volume index was normal or below normal. The color index was never greater than the volume index, which showed conclusively that the color index was due to the large size of the cells and not to supersaturation of the cells with hemoglobin. The observations of Capps had little clinical application by other workers for many years. Now all hematologists agree that the most characteristic and constant feature of the blood in active pernicious anemia is the increased volume of the average erythrocyte, which is best recorded in terms of volume index.

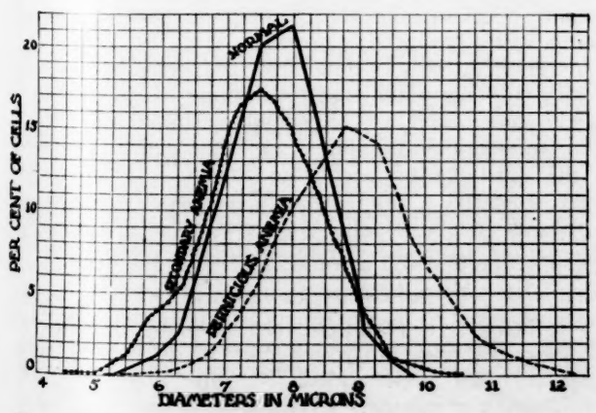


Fig. 1.—Distribution curve (Price-Jones) of erythrocytes in pernicious anemia compared with that of normal blood and other types of anemia.

Price-Jones [10] has emphasized anew the value of the determination of the diameter of the cells in various types of anemia. He measures a large number of cells by means of the attachment of a camera lucida to the microscope and records the results in the form of a distribution curve. In pernicious anemia the curve is a characteristic one; the mean diameter being greater than normal, the peak is shifted to the right; the number of cells of any one diameter is less than normal and there is greater variation than in normal cells, so that the curve is broad based and flattened out (fig. 1).

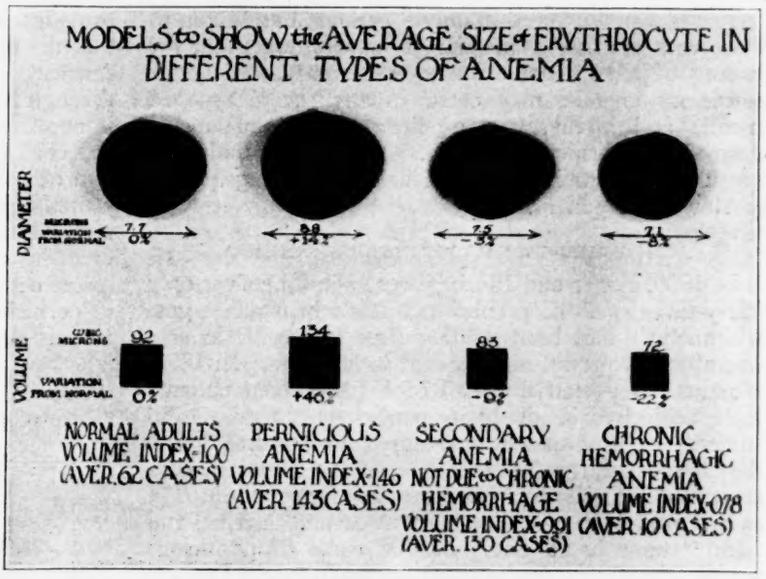


Fig. 2.—Change in diameter of erythrocytes compared with change in volume.

The volume of the cell is a much more sensitive indicator of cell size than is the diameter, since the volume varies as the cube of the diameter. Thus, if the average cell diameter is 8.8 microns or 14 per cent greater than normal, the cell volume is increased 46 per cent (fig. 2).

Although most hematologists are agreed that macrocytosis of the erythrocyte is the most characteristic finding in pernicious anemia, others emphasize only an increase in color index. The characteristic distribution curve of Price-Jones, which has been mentioned, has not been widely used clinically because of the time required for the determination. Jörgensen and Warburg [11] consider the finding of more than 15 per cent of the number of erythrocytes having a diameter greater than 8.6 microns (normal, 7.7 microns) as extremely suggestive of pernicious anemia and the best hematologic criterion of the disease. Capps [9] found the volume index to be within normal limits in only three of thirty cases, and Jörgensen and Warburg [11] found this to be the case in seven of twenty-six cases of pernicious anemia. In Murphy and Fitzhugh's [12] series the average cell volume was less than normal in only four of sixty-five definite cases of pernicious anemia in which liver therapy had not been utilized. Wintrobe [13] found an increased mean cell volume in every one of sixteen cases. In 1924 I [14] reported fifty consecutive cases in

7. Welcker, H.: Grösse, Zahl, Volum, Oberfläche und Farbe der Blutkörperchen bei Menschen und bei Thieren, Ztschr. f. rat. Med. **20:** 257-307, 1863.
8. Hedin, S. G.: Der Hämatocrit, Skandinav. Arch. f. Physiol. **2:** 134-140, 1891.
9. Capps, J. A.: A Study of Volume Index: Observations upon the Volume of Erythrocytes in Various Disease Conditions, J. M. Res. **10:** 367-401, 1903.
10. Price-Jones, C.: The Diameters of Red Cells in Pernicious Anemia and in Anemia Following Hemorrhage, J. Path. & Bact. **25:** 487-504 (Oct.) 1922.
11. Jörgensen, Stefan; and Warburg, E. J.: The Indices and Diameters of the Erythrocytes and the Best Hematological Criterion of Pernicious Anemia: Histological Notes and Normal Values, Act. med. Scandinav. **66:** 109-134, 1927.
12. Murphy, W. P., and Fitzhugh, Greene: Red Blood Cell Size in Anemia: Its Value in Differential Diagnosis, Arch. Int. Med. **46:** 440-457 (Sept.) 1930.
13. Wintrobe, M. M.: Hemoglobin Content, Volume and Thickness of the Red Blood Corpuscle in Pernicious Anemia and Sprue, and the Changes Associated with Liver Therapy, Am. J. M. Sc. **181:** 217-239 (Feb.) 1931.
14. Haden, R. L.: The Value of Volume Index in the Diagnosis of Pernicious Anemia, J. A. M. A. **83:** 671-674 (Aug. 30) 1924.

which, without exception, the volume index was above normal.

Macrocytosis of the erythrocytes may occur also in anemias other than pernicious anemia. The most important types are pseudoleukemia (von Jaksch's anemia) of children, sprue, poisoning [13] by certain coal tar derivatives, hemolytic jaundice, and conditions which interfere with normal stomach secretion, such as carcinoma of the stomach and gastric resection. In a study of 311 cases of anemia of all types, I found an increased volume index in only 9 patients in addition to those with pernicious anemia. Evans [15] thinks that the finding of a high color index, while characteristic of pernicious anemia, may occur in any severe type of anemia and is therefore of little help in making a diagnosis of pernicious anemia. A high color index he considers only as indicative of a long standing anemia of slow development.

ACHLORHYDRIA IN PERNICIOUS ANEMIA

In 1900, Faber and Bloch [16] were able to collect only thirty-three cases of pernicious anemia in which a gastric analysis had been made. Free hydrochloric acid was absent or greatly diminished in all cases. In 1897, Martius [17] reported that two of his seventeen patients with achlorhydria died of pernicious anemia. All students of this disease now agree with Hurst [18] that the absence of free hydrochloric acid is almost a constant finding. Evans [15] reports no free acid in 111 cases, Panton [19] none in 117 cases, and Levine and Ladd [20] none in all but 1 of 107 cases of pernicious anemia in which a gastric analysis was made. Percy [21] made a gastric analysis in thirty-five cases and found a trace of acid in two cases and none in thirty-three. Faber and Gram [22] found free acid in four of fifty-four patients. Numerous instances are reported in which an achlorhydria had been demonstrated many years before the onset of an anemia. The achlorhydria is a permanent condition and so does not fluctuate with the remission of the disease; this condition occurs quite commonly in immediate relatives of patients suffering from pernicious anemia. I have observed one patient in whom achlorhydria was present for twenty years before the anemia was evident.

Many observers have thought that the absence of free acid might be a definite etiologic factor in the causation of the disease. Hydrochloric acid is the normal antiseptic of the stomach; therefore, when achlorhydria is present, many bacteria are found in the stomach and upper intestinal tract where normally none are found. It is also quite possible that peptic digestion is quite different from normal digestion in the absence of acid. For many years pernicious anemia was considered to be a hemolytic disease due to some toxin probably derived from the intestinal tract as the result of abnormal digestion or bacterial activity. Newer studies, however, have changed the point of view entirely concerning the etiology of the disease. Whipple [23] first emphasized that anemia is a disturbance in stroma formation rather than in excessive hemolysis. Peabody [24] showed that the bone marrow was crowded with cells in the case of a relapse and was normal in a remission. This finding could not be correlated with the old view that in a remission the bone marrow was making cells faster than normal, and, in a relapse, slower than normal. The work of Castle [25] provides the final link in the chain of evidence to prove that the disease is primarily a deficiency, probably of a ferment normally provided by the stomach, which through its action on protein furnishes something which is necessary to complete the growth and emergence of red cells from the bone marrow. The absence of free hydrochloric acid is an indication then of the lack of something which is a necessary factor in blood regeneration. This unknown substance may be present in many cases in which free acid is absent, as shown by the frequent occurrence of achlorhydria without the presence of pernicious anemia, but is seldom if ever found if free acid is present. Such a condition is conceivable and probably explains the rare finding of true pernicious anemia when free acid is present.

Number, Volume and Hemoglobin Content of the Erythrocytes and of Gastric Analyses in One Hundred and Fifty-Two Cases of Pernicious Anemia

Group (Red Blood Count in Millions)	Number of Cases	Average Red Blood Cell Count (Millions)	Average Volume of Packed Cells (% of Normal)	Average Hemoglobin (% of Normal)	Volume Index			Color Index			Free Hydrochloric Acid in Gastric Contents
					Mean	Highest	Lowest	Mean	Highest	Lowest	
0 -0.5	3	0.39	14	13	1.89	2.00	1.66	1.68	1.88	1.33	0
0.5-1.0	22	0.79	25	23	1.58	2.24	1.21	1.46	1.88	1.15	0
1.0-1.5	37	1.21	37	33	1.52	2.00	1.13	1.38	1.80	0.80	0
1.5-2.0	31	1.71	51	46	1.49	2.02	1.19	1.36	1.80	1.08	0
2.0-2.5	23	2.26	67	61	1.47	1.73	1.15	1.36	1.62	0.93	0
2.5-3.0	23	2.70	74	78	1.39	1.63	1.17	1.31	1.54	0.94	0
3.0-3.5	7	3.20	84	79	1.28	1.46	1.16	1.24	1.41	0.94	0
3.5-4.0	6	3.68	91	88	1.22	1.34	1.13	1.19	1.34	1.07	0
0 -4.0	152	1.81	52	48	1.48	2.24	1.13	1.36	1.90	0.80	0

In reporting twenty-nine cases of pernicious anemia in 1923 I [26] suggested that the finding of an increased volume index and an achlorhydria should be a constant, an essential and almost a pathognomonic evidence of the existence of pernicious anemia. The present paper concerns a study of 152 consecutive cases of pernicious anemia which have come under my personal observation, from the standpoint of this relationship.

METHODS OF STUDY

The hematocrit readings were made by centrifugating 10 cc. of blood, to which 2 cc. of an isotonic anticoagulant had been added, for one hour at 2,500 revolutions per minute. Erythrocyte counts were made on oxalated blood and the mean corpuscular volume (volume of the average single cell) and the volume index calculated for every patient, as described elsewhere.[27] Hemoglobin determinations were made by the

15. Evans, F. E.: Pernicious Anemia, Baltimore, Williams & Wilkins Company, 1926.

16. Faber, K., and Bloch, C. E.: Ueber die pathologishen Veränderungen am Digestiontractus bei der perniciöser Anämie und ueber die sogenannte Darmotrophie, Ztschr. f. klin. Med. **40:** 98-136, 1900.

17. Martius, F.: Achylia Gastrica: Ihre Ursachen und Folgen, Leipzig, 1897.

18. Hurst, A. F.: Achlorhydria: Its Relation to Pernicious Anemia and Other Diseases, Lancet **1:** 111-115 (Jan. 20) 1923.

19. Panton, P. N.; Maitland-Jones, A. G., and Riddoch, G.: Analysis of 117 Cases of Pernicious Anemia, Lancet **1:** 274-279 (Feb. 10) 1923.

20. Levine, S. A., and Ladd, W. S.: Study of 150 Consecutive Cases of Pernicious Anemia with Special Reference to Gastric Anacidity, Bull. Johns Hopkins Hosp. **32:** 254 (Aug.) 1921.

21. Percy, N. M.: Blood Transfusion in Association with Other Surgical Procedures in the Treatment of Pernicious Anemia. Tr. Am. S. A. **38:** 451-462, 1920.

22. Faber, Knud; and Gram, H. C.: Relations Between Gastric Achylia and Simple and Pernicious Anemia, Arch. Int. Med. **34:** 658-668 (Nov.) 1924.

23. Whipple, G. H.: Pigment Metabolism and Regeneration of Hemoglobin in the Body, Arch. Int. Med. **29:** 711-731 (June) 1922.

24. Peabody, F. W.: The Pathology of the Bone Marrow in Pernicious Anemia, Am. J. Path. **3:** 179-201 (May) 1927.

25. Castle, W. B.: Observations on the Etiologic Relationship of Achylia Gastrica to Pernicious Anemia, Am. J. M. Sc. **178:** 748-764 (Dec.) 1929.

26. Haden, R. L.: The Diagnosis of Pernicious Anemia, J. Missouri M. A. **20:** 158-161 (May) 1923.

27. Haden, R. L.: The Technic of Determination of the Relative Mass, the Individual Cell Volume, and the Volume Index of the Erythrocytes of Man, J. Lab. & Clin. Med. **15:** 736-746 (May) 1930.

oxygen capacity method using the Van Slyke blood-gas apparatus. In making the gastric analysis the patient was given two arrowroot biscuits and a glass of water, and a specimen was removed at the end of an hour. A fractional analysis was made in many instances, specimens being removed hourly for three hours. The cases

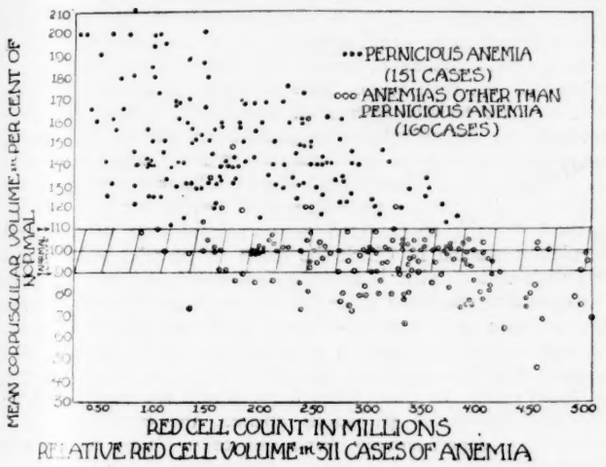

MEAN CORPUSCULAR VOLUME IN PER CENT OF NORMAL
••• PERNICIOUS ANEMIA (151 CASES)
ooo ANEMIAS OTHER THAN PERNICIOUS ANEMIA (160 CASES)
RED CELL COUNT IN MILLIONS
RELATIVE RED CELL VOLUME IN 311 CASES OF ANEMIA

Fig. 3.—Mean corpuscular volume in pernicious anemia compared with that in other types of anemia.

reported represent almost all the patients seen during the period of the study. A very small number of patients were too ill to justify a gastric analysis and therefore are not included in this study. I have seen every patient personally and have also studied the blood.

RESULTS OF STUDY

One hundred and fifty-two patients have been studied. The results of the blood and gastric examinations have been grouped according to the blood count (table 1). The volume and color indexes are recorded for each group. The average cell count for the entire group is 1.81 millions, the highest being 3.68 and the lowest 0.39 million. Forty-five per cent of the counts were between 1.0 and 2.0 millions, and 91 per cent were under 3.0 millions. The average volume index is 1.48, corresponding to a mean corpuscular volume of 136 cubic microns (normal 92 cubic microns). The highest volume index was 2.24 and the lowest 1.13. The color index was constantly lower than the volume index, the average being 1.36, the highest 1.90, and the lowest 0.80. In the active cases the mean cell volume varies little with the count, often being as great with a count of 3.0 millions as with a count of 1.0 million. The size of the erythrocytes in the group with pernicious anemia as contrasted with that in 160 cases of other types of anemia is shown in figure 3. The one constant finding in the blood was macrocytosis. With very low counts usually anisocytosis was present as well, while in the case of high counts only a uniform macrocytosis was present. Stained films were studied in every instance, but megaloblasts were seldom found, although nucleated erythrocytes were seen not infrequently.

In every case achlorhydria was present and usually the total acid was quite low. In cases in which the gastric analysis has been repeated at intervals the achlorhydria has persisted even with a return of the blood to normal. There was no other characteristic finding in the gastric contents.

During the period covered by this study, 260 supposedly normal individuals and patients with other types of anemia have been studied by the same method. In only nine instances has a volume index greater than 1.10 been found. In each of these, free acid was present on gastric analysis. Many of the patients with other types of anemia had an achlorhydria, but seldom was there any difficulty in the differential diagnosis. In one patient in the series, a moderate anemia of undetermined etiology was found, also increased bilirubin content of the plasma; no free acid was found in one of three gastric analyses. This patient had no gastrointestinal or neurologic symptoms but did improve with liver therapy. This is the only questionable case of the entire series and is not included as a case of pernicious anemia.

The size of the erythrocytes is certainly the best index to the efficacy of the treatment. If the missing principle the lack of which is responsible for pernicious anemia is supplied adequately, the cell volume returns to normal (fig. 4), and if it is not so supplied the increased cell size persists (fig. 5). If too much of the missing substance is given, the cell volume may then drop below normal. In the treatment of pernicious anemia, liver or some efficient substitute should be given until the mean corpuscular volume returns to normal and remains so. The first sign of a relapse is detected by the increase in cell size. The cell volume is the best index of macrocytosis, since it is the most sensitive indicator of a change in size. The cell diameter may be well utilized, however, as a measure of size, as emphasized by Price-Jones. The distribution curve has the added advantage of showing graphically the degree and extent of anisocytosis. I [28] have reported elsewhere the results of a comparative study of cell volume and cell diameter in fifty cases of pernicious anemia. Measurements of cell diameter are too laborious, however, to be applied clinically in most laboratories.

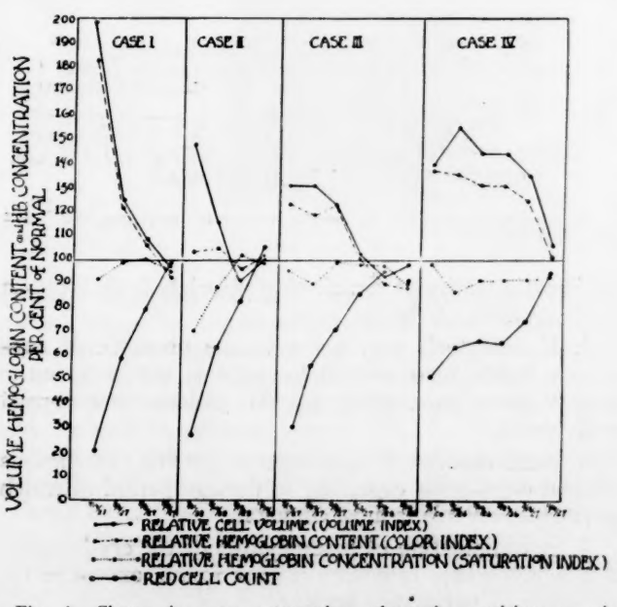

VOLUME HEMOGLOBIN CONTENT and HB. CONCENTRATION PER CENT of NORMAL
CASE I
CASE II
CASE III
CASE IV
RELATIVE CELL VOLUME (VOLUME INDEX)
RELATIVE HEMOGLOBIN CONTENT (COLOR INDEX)
RELATIVE HEMOGLOBIN CONCENTRATION (SATURATION INDEX)
RED CELL COUNT

Fig. 4.—Change in mean corpuscular volume in pernicious anemia adequately treated. The cell volume returns to normal.

Rough measurements of the peak diameter may be made with the eriometer of Emmons [29] or the halom-

28. Haden, R. L.: Comparison of Methods for Determining the Size of the Erythrocyte, J. Lab. & Clin. Med. **16**: 976 (July) 1931.

29. Emmons, W. F.: A Clinical Eriometer, Quart. J. Med. **21**: 83-90 (Oct.) 1927.

eter.[30] Such measurements are, however, only approximately correct. In the presence of anisocytosis, readings are indistinct and difficult to make. Davidson [31] has discussed recently the clinical value of such instruments.

SUMMARY

1. An increase in size of the average erythrocyte, best indicated in terms of volume, is the most constant and characteristic finding in the blood in the presence of pernicious anemia. An increased volume index was found in every patient in this series.

2. Free hydrochloric acid is seldom, if ever, found in the gastric contents of a patient with idiopathic pernicious anemia. An achlorhydria was demonstrated in every one of the 152 patients in this series.

3. The mean corpuscular volume may be quite large even with a relatively high count; therefore it does not vary with the red cell count.

4. If the deficiency which is responsible for the disease is adequately supplied, the cells return to normal size. The first indication of a relapse or a lack of a sufficient quantity of the missing principle is an increase in the volume of the red cells.

5. Macrocytosis may occur in the presence of conditions other than pernicious anemia but was found only 9 times in a study of 411 patients and normal individuals.

6. Achlorhydria is a frequent finding in various clinical conditions, especially in the age period in which pernicious anemia is most common.

7. A combination of macrocytosis of the erythrocytes and achlorhydria is seldom if ever found, except in the presence of pernicious anemia.

8. The finding of an absence of free hydrochloric acid on gastric analysis and an increased mean corpuscular volume or plus volume index is a practically constant finding and one that is necessary for the diagnosis of active pernicious anemia; if demonstrated, it is almost pathognomonic of the disease.

2050 East Ninety-Third Street.

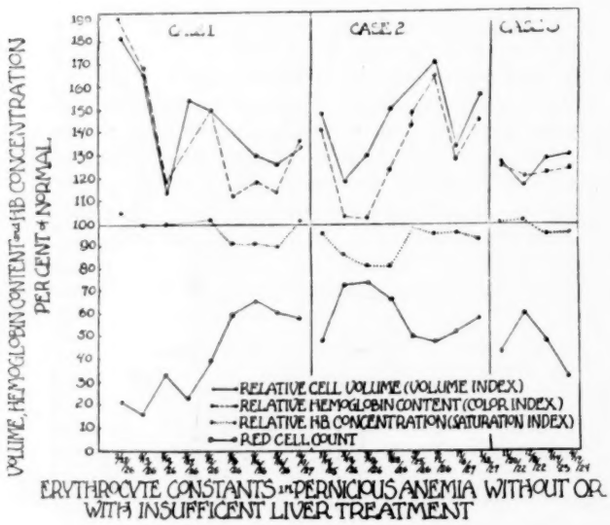

CASE 1
CASE 2
CASE 3
VOLUME, HEMOGLOBIN CONTENT AND HB CONCENTRATION PER CENT OF NORMAL
RELATIVE CELL VOLUME (VOLUME INDEX)
RELATIVE HEMOGLOBIN CONTENT (COLOR INDEX)
RELATIVE HB CONCENTRATION (SATURATION INDEX)
RED CELL COUNT
ERYTHROCYTE CONSTANTS IN PERNICIOUS ANEMIA WITHOUT OR WITH INSUFFICIENT LIVER TREATMENT

Fig. 5.—Change in mean corpuscular volume in pernicious anemia not adequately treated.

30. Eve, F. C.: Early Diagnosis of Pernicious Anemia by Halometer, Brit. M. J. **2**: 48-49 (July 13) 1929.

31. Davidson, Stanley: Diffraction Methods in the Diagnosis of Pernicious Anemia, Brit. M. J. **2**: 193 (Aug. 2) 1930.

ABSTRACT OF DISCUSSION

DR. THOMAS FITZHUGH, JR., Philadelphia: The combination of macrocytosis and achlorhydria is accepted by all workers as the best group of diagnostic observations in this disease. In any given blood, if the red cells of supernormal size predominate over the red cells of normal or of subnormal size, the mean cell volume will be greater than normal. If, on the other hand, the cells of supernormal size do not predominate, one may have that combination in which macrocytosis or megalocytosis occurs with a predominance of small cells and a mean corpuscular volume of less than unity. The theoretical point here is this: Is the characteristic feature of pernicious anemia the mere presence of megalocytosis, regardless of the occurrence of microcytes, or is it the predominance of megalocytes over cells of normal and of subnormal size? The experience of all workers is in practical agreement with Dr. Haden's. Using his method, I have encountered an occasional case of untreated pernicious anemia in which the mean corpuscular volume was less than unity. That is an exception, however. In such cases the spread of the blood gives the clue to this situation; namely, the presence of a number of very large red cells, macrocytes or megalocytes, but with a predominance (as judged by that somewhat faulty method of estimating size in a stained spread) of small cells. In these cases there is still the nearly pathognomonic feature of pernicious anemia, the occurrence of a number of supernormally sized red cells. This in no way impairs the practical validity of Dr. Haden's thesis. Similarly in regard to achlorhydria: It is the universal observation of others that achlorhydria is characteristic of pernicious anemia. A few cases have been reported, as Dr. Haden mentioned, in which free hydrochloric acid was found and in which, in the light of Castle's brilliant work, the fundamental gastric defect of pernicious anemia may be present even though free acid is present. I employ the histamine method of testing for hydrochloric acid simply because occasionally a person may have achlorhydria by the ordinary methods of gastric analysis, who, on the administration of histamine, will be shown to have free hydrochloric acid present. I have yet to encounter a case of pernicious anemia, however, in which by the histamine method or any other, any free hydrochloric acid has been found in the disease either before, during or after treatment.

DR. A. C. IVY, Chicago: I should like to point out that achlorhydria alone is not the cause of macrocytosis. If the anemia occurs in some gastrectomized dogs, the cells remain normal in size or decrease in size. I should like to ask Dr. Haden's opinion relative to the effect of iron on the size of the red blood corpuscles in the macrocytic type of anemia sometimes associated with achlorhydria.

DR. DEWEY DAVIS, Richmond, Va.: I should like to ask Dr. Haden whether he is able to differentiate the anemias megalocytic in type that are seen in pregnancy, sprue and certain other conditions from the megalocytic anemia, pernicious anemia, by the appearance of the megalocytes, their shape, depth of color, and so on.

DR. R. L. HADEN, Cleveland: Dr. Fitzhugh is entirely correct in his point that the average cell volume and volume index in pernicious anemia may not be more than 1 because of the presence of a preponderance of microcytes. This has never occurred, however, in my experience. In such a case many macrocytes should be present even when the average cell volume is less than 1. Jörgensen and Warburg think that it is more characteristic to get a certain percentage (15 or more) of cells with a diameter greater than the average than to get a volume index greater than 1. It is certainly true that the anemia in pernicious anemia is not due to the absence of acid alone but to the absence of something else, of which the achlorhydria is only an indication. I feel strongly that iron makes the cells grow larger, or increases cell stroma, in the secondary anemias in which the cells are small. I have discussed this point with a number of men interested in anemia, and no one seems to have given much consideration to this angle of the question. Perhaps too much emphasis has been placed on the action of iron in relation to hemoglobin and not enough on the relation to stroma formation. In answer to Dr. Davis's question, I do not think one can differentiate the cells in pernicious anemia and other macrocytic anemias. The anemias

with a blood picture of pernicious anemia may well be divided into the idiopathic and the symptomatic groups. In sprue the blood picture may be no different from that characteristic of idiopathic pernicious anemia, so one may designate the anemia as symptomatic pernicious anemia. The same is true of the macrocytic anemia of pregnancy. The cause of idiopathic pernicious anemia is gradually becoming clearer. In time all the macrocytic or so-called pernicious anemias will be designated as symptomatic.

THE PATHOLOGY AND TREATMENT OF CORNEAL ULCERS *

OSCAR B. NUGENT, M.D.
CHICAGO

There has been comparatively little written on corneal ulcers in the last few years, because practically nothing new has been developed on this subject. Evans [1] states that out of 700 old blind people he found that 45 were blind because of corneal opacities. Most corneal opacities are caused by ulceration, and, when one takes into consideration the vast number of corneal opacities caused by ulceration that produce partial blindness or only slight reduction in vision, one is impressed with the necessity for further study in the management of this disease.

The behavior of the cornea in health, disease and injury has been quite well established by careful investigators, and while there are still some existing conditions that must be viewed through a mist of indefinite knowledge, the bridging of the latter has led to a very satisfactory understanding of the cornea in health and in disease.

NORMAL AND PATHOLOGIC ANATOMY OF THE CORNEA

A brief review of the histology of the five layers of the cornea is given here for obvious reasons.

The epithelium of the cornea (fig. 1) consists of about five layers of cells, which may be greatly increased in disease conditions. Some [2] have given the number of layers as ten. The superficial cells are squamous or flattened, while the extreme inner layer consists of cylindric cells with oval nuclei situated high in the cell, leaving considerable cell tissue at the base. These cells are free from granules. The cells between the basal and the superficial layers assume a shorter and more flattened shape toward the surface layer, while the surface epithelial cells themselves lie on one another similar to shingles on a roof. Small spaces have been demonstrated in the central layers, known as Recklinghausen's canals. These canals are probably potential and do not exist in the cornea as really open spaces. The epithelial layer is different from the other layers, as it is made up of individual cells, each containing a distinct nucleus and bridged together with an intercellular cement; they are quite easily separated by liquid.

Regeneration of epithelial cells, following abrasions of the cornea (figs. 10 and 11), rapidly replaces lost tissue. Complete removal of the cells from the anterior surface of the cornea is replaced by new epithelial cells within five or six days.[3] There is normal exfoliation of the epithelial cells from the surface of the cornea similar to the well known exfoliation of the surface layers of the skin, new cells being regenerated from the basal epithelium but not from the surface epithelial cells, as these have little vitality.[4] It is thought that only the two basal cell layers of epithelium have to do with regeneration.[5]

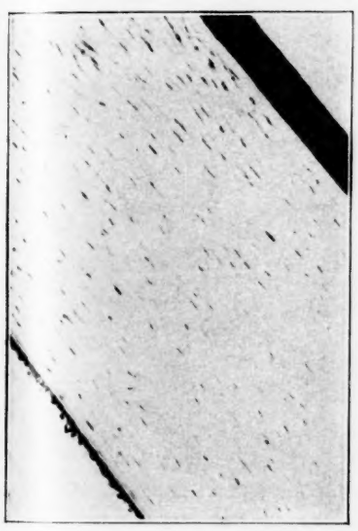


Fig. 1.—Normal cornea.

Fig. 2.—Residential cells (section through cornea, parallel to surface).

Fig. 3.—Edema of corneal epithelium. (Ramon Castroviejo.)

Bowman's membrane, a thin homogeneous structure, lies just beneath the basement epithelial cells of the cornea, the embryologic origin of which is disputed. Some maintain that it comes from the mesoderm; [6] von Szily and others are convinced that it originates from the ectoderm along with the lamella of the stroma,[7] while others hold different opinions.[8]

Bowman's membrane usually becomes thinner during pathologic changes (fig. 7) and offers little resistance

---

* From the Ophthalmological Department, Chicago Eye, Ear, Nose and Throat Hospital.

* Read before the Section on Ophthalmology at the Eighty-Second Annual Session of the American Medical Association, Philadelphia, June 11, 1931.

1. Evans, J. J.: Blindness in Old Age, Brit. M. J. **2**: 847 (Nov. 9) 1929.

2. Collins and Mayov: Pathology and Bacteriology of the Eye, ed. 2 Philadelphia, P. Blakiston's Son & Co., 1925.

3. Rucker, C. W.: Regeneration of the Cornea, Arch. Ophth. **2**: 692 (Dec.) 1929.

4. Kirby, D. B.: Keratitis Exfoliativa Complicating Dermatitis Exfoliativa (Arsphenamine), Arch. Ophth. **2**: 661 (Dec.) 1929.

5. Matsumato, S., and Ishimaru, H.: A Contribution to the Study of Epithelial Movements, Acta scholae med. univ. imp. Kioto **5**: 167, 1922.

6. Mann, Ida: Development of Human Eyes, Cambridge University Press, 1928, p. 38.

7. Fuchs, Ernst: Localization of Pathological Changes in the Cornea, Arch. Ophth. **3**: 588 (May) 1930.

8. Isleal, Norma E.: Contributions to the Development of the Cornea, Am. J. Ophth. **12**: 469 (June) 1929.

to the progress of inflammation or necrosis. It never regenerates but fills in with a fibrous network (fig. 4), resulting in a scar formation, which produces opacities. If, however, a necrotic area can be kept aseptic, healthy transparent epithelial tissue will fill the necrotic space instead, and the result is very little or no opacity. This I have repeatedly demonstrated by slit lamp examination in experiments with corneal ulcers during the last three years.

The substantia propria is developed from mesoblasts and quite likely is the product of cells that lie just anterior to Descemet's membrane.[9] It fills the space between Bowman's and Descemet's membranes and has about sixty potential lymph spaces containing many cells, some of which are the so-called residential cells, branched, with their greatest diameter parallel to the surface of the cornea (fig. 2). Others are also wandering cells and lymphocytes.

The circulation in the stroma is not definitely known, but I am of the opinion that the flow is of two kinds: Lymph containing nutriment elements originates from the limbus capillaries and flows toward the center of the cornea, more freely in the lymph spaces just anterior to Descemet's membrane, then, probably, flowing forward to fill the anterior lymph spaces. Several known facts lend their support to this theory:

First: I have been able, in a case of argyrosis, to demonstrate a definite stain in the lamella of the deeper layers of the cornea much more marked near the limbus and becoming less noticeable toward the center, while the anterior layers are free from stain. Other authors have described the same condition.[10] This would indicate that the flow of lymph was more pronounced in that part of the cornea, as the silver stain was doubtless carried there by the lymph.

Second: The fact that pigment granules migrate forward toward the anterior layers of the cornea would indicate a definite circulation from the posterior to the anterior layers.[11]

Third: Metabolism is far more active at the periphery than at the center of the cornea.[1] This could not occur if the nourishment to the cornea came from the aqueous or tears.

Descemet's membrane is thought to be the product of the endothelial cells. It is a homogeneous, elastic membrane and is the main support of the cornea.[12] It has a tendency to become thicker under the influence of inflammation and infection (fig. 11). It has been repeatedly demonstrated, both clinically and by experimentation, that this membrane offers much resistance to inflammation and especially to necrosis. The endothelial cells on its posterior surface have much to do with its formation in the embryo and its nourishment in later life.

Metabolism of the cornea is insignificant because of so little actual cell activity, as its function is support and refraction. The greatest cell activity is in the epithelial layer, as there is a constant and normal desquamation of the surface epithelial cells, which must be replaced by regeneration. Metabolism is far more active in the periphery than at the center, which explains why a serpiginous ulcer always comes to a standstill before it reaches the limbus.[1]

Nerve distribution in the cornea has much to do with the normal maintenance of metabolism, as certain dystrophias and ulcerations have been proved to be the direct result of nerve insufficiency. Section of the fifth nerve produces desquamation and swelling of the corneal epithelial cells beginning within five hours.[13]

Fig. 4.—Perforating injury to cornea and lens; healed without infection. Bowman's membrane is normal.

Fig. 5.—Serial section through cornea with ulcer. Top, farthest from ulcer; center, through infiltrated area; bottom, through ulcer. (Ramon Castroviejo.)

Fig. 6.—High magnification (top, fig. 5). Notice increasing thickness of the epithelium, thinning of Bowman's membrane, inflammatory spindles and scattered round cell infiltration. Normal Descemet's membrane. (Ramon Castroviejo.)

ETIOLOGY AND PATHOLOGY OF CORNEAL ULCERS

Primary corneal ulcers most frequently originate in the surface epithelial cells of the cornea and are usually due to bacterial invasion. Their point of origin is generally due to traumatism of the surface cells, which become infected, and necrosis results. Corneal ulcers may be the direct result of bacterial growth without traumatism to the surface epithelium, the germs most responsible for the latter condition being the pneumo-

9. Collins and Mayov: Pathology and Bacteriology of the Eye, p. 77.
10. Vogt, Alfred: Further Investigations of Argyrosis of the Eye, or Pseudosclerosis, Klin. Monatsbl. f. Augenh. **5**: 1 (July) 1930. Friedman, Benjamin; and Rötth, András: Argyrosis Cornea, Am. J. Ophth. **13**: 1050 (Dec.) 1930.
11. Lahlein, W.: Experiments of Pigment Wandering in the Epithelial Layer of the Cornea, Arch. f. Augenh. **102**: 487, 1930.
12. Fuchs, A.: Ztschr. f. Augenh. **67**: 129 (Feb.) 1929.
13. Tagawa, S.: The Properties of the Corneal Surface After Section of the Fifth Nerve, Arch. f. Augenh. **102**: 231 (Dec.) 1929.

coccus and, less often, the diphtheria bacillus. Germs found on the surface of normal cornea are the pneumococcus, Staphylococcus xerosis, diplococcus and Bacillus subtilis.[14]

It is my belief that all corneal ulcers are, either directly or indirectly, due to bacterial infection; although I[15] was not able to determine the germ in all cases either by smear or by culture, nevertheless in the few cases in which bacteria were not found the clinical picture and behavior was, in a general way, identical with those of known germ origin. Therefore, it is to be assumed that the doubtful cases are caused by infection as well and that the germs were so deeply situated in the corneal tissue that it was not possible to isolate them.

Invasion of bacteria into the cornea invites corneal inflammation, in which there is a swelling of the branched or residential cells, with a greater or lesser engorgement of the potential lymph spaces with leukocytes, round cell infiltration and fibrous exudates (figs. 6 and 7). There is edema of the cornea (fig. 3), noted particularly in the epithelial cells. In the beginning of corneal necrosis, there is an area of infiltration surrounding the ulcer, while death of the cells takes place at the point of necrosis. Toxins, the result of bacterial invasion, diffuse to the periphery and induce hyperemia, which makes possible permeability of the vessel walls to plasma and the emigration of leukocytes, while the latter are attracted by positive chemotaxis to the focus of infection[16] (fig. 9).

Before they reach the area of infection, however, they are acted on by the bacterial toxins and become inactive and die. The accumulation of cells, therefore, in the meshes of the cornea produces a grayish infiltrated area surrounding the ulcer. This ring of infiltration acts in two capacities, in that it walls off the necrotic area (thereby separating it from its normal nutriment supply and allowing of more rapid necrosis), and it walls off, in a measure, the advancement of further germ invasion into the surrounding cornea.

When a section is examined, the wandering cells are seen to be crowded into the lymph spaces in rows and in apparent groups more heavily formed at the points of apparent communication of one lymph space with another. They are sometimes pressed into spindle-shaped formation, called inflammatory spindles (figs. 6-14). The fixed, or residential, cells do not take as deep a stain as do the round cells and they are differentiated from them by this fact. However, the former, after undergoing degeneration, often form small round bodies and take a much deeper stain, which causes them to be confused with leukocytes.

The condition just described is an attempt to stop the further progress of the destructive processes, while later certain changes take place to stimulate or produce healing or repair. The first sign of the process or repair is seen best by the aid of the slit lamp or corneal microscope. Small and numerous extensions of the loops of the superficial circumcorneal blood capillaries (fig. 13) are seen to begin to penetrate into the cornea deep in the epithelial layers. This is the beginning of pannus, or corneal vascularization (fig. 12), which usually begins at the upper border of the limbus, under the upper lid. This is more especially marked in trachomic[1] ulcers, but in simple ulcers they usually originate from the part of the limbus nearest the ulcer. These vessels penetrate to the base of the ulcer, where the blood supply assists in the formation of granulation tissue, and the deeper cavity of the ulcer is filled with fibrous tissue,[17] which is soon covered with epithelium.

Fig. 7.—High magnification (center, fig. 5). Marked thickening of epithelium covered with exudate. Bowman's membrane has disappeared. Marked infiltration in anterior layers of stroma. Marked thickening of Descemet's membrane and exudate on posterior surface of cornea. (Ramon Castroviejo.)

Fig. 8.—High magnification of bottom section in figure 5, showing healing edge of ulcer, epithelium growing down into the ulcer; much loss of tissue in anterior portions; marked infiltration and thickened Descemet's membrane. (Ramon Castroviejo.)

Fig. 9.—Section through serpiginous ulcer, showing method of progress on lower side and healing edge on top. Destruction of Bowman's membrane and anterior layers of stroma. Much infiltration and thickening of Descemet's membrane.

TREATMENT OF CORNEAL ULCERS

The clinical classification of ulcers of the cornea will not be given in this paper, but attention will rather be directed to the treatment of corneal necrosis due to bacterial invasion.

Much worthy and creditable work has been done on the treatment of corneal ulcer by those investigators who have called attention to such measures as are now

14. Blank, A.: The Germs Found on the Normal Cornea, Arch. f. Ophth. **122**: 661, 1929.
15. Nugent, O. B.: Ultraviolet Radiation in the Treatment of Corneal Ulcers, Arch. Physical Therapy **11**: 660 (Dec.) 1930.
16. Parsons, J.: Pathology of the Eye, London, Putnam & Sons **1**, part 1, p. 186.
17. Collins and Mayov: Pathology and Bacteriology of the Eye, p. 449.

being used. But after all these have been tried there is still a feeling of the need for a more efficient method of dealing with the condition.

The proper procedure, therefore, in the treatment would seem to be, first and most important, to produce an aseptic condition as rapidly and thoroughly as is possible. To do this, many agents are listed in the classic treatment for corneal necrosis, such as those mentioned in the standard textbooks on ophthalmology. To these may be added the following, taken from the more recent literature: oil of wintergreen for ulcus serpens;[18] ethylhydrocupreine for ulcus serpens;[19] subconjunctival injection of neutral atropine sulphate;[20] repeated peripheral corneal punctures for ulcus serpens;[21] cauterization of serpiginous ulcers with chromicized wire;[22] administration of vitamin A;[23] insulin incorporated in a cholesterinated ointment in atrophic ulcers of the cornea.[24]

Further, in the treatment of corneal complications (ulcer, pannus) of trachoma, the old method of subconjunctival injections of mercuric cyanide, along with other antitrachomatous measures;[25] angeluccis tracholysine (physiologic solution of sodium chloride, 0.3 per cent; sodium sulphate, 0.05 per cent; calcium glycerophosphate, 0.5 per cent; sodium nucleinate, 0.5 per cent; procaine hydrochlorate, 1 per cent; phenol, 1 per cent; distilled water, 100 Gm.);[26] carbon dioxide snow[27] and chaulmoogra oil.[28]

Arruga[29] recently described a new form of electrical treatment which is called iontophoresis, using a 2 milliampere galvanic current with the anode over the cornea, saturated with a 1:100 solution of ethylhydrocupreine hydrochloride, and the cathode on the cheek. Twenty-one cases of corneal ulcer treated in this manner gave satisfactory results, in most of them the advantage being a thinner scar.

For fifteen years or, perhaps, more, ultraviolet treatment of corneal ulcers has been used and spoken of in the literature, but owing to the want of proper methods of application of the ray it has not come into popular use until recently. Fuchs,[30] quoting Hertel and Schanz, said, "phototherapy, or the application of light, especially light very rich in ultraviolet rays, has been used in corneal ulcers."

Quite recently, also, phototherapy has been advocated by Gutmann.[31] Short ray therapy is mentioned for treatment of corneal erosions by Krasso, who reported good results.[32] Electrocautery or pasteurization of corneal ulcers has been recognized by many as one of the best methods of treatment. But Dennan[33] mildly states in a recent paper that ultraviolet irradiation is superior to the electrocautery, and Neuschieler[34] most emphatically states that ultraviolet irradiation gives good results in the treatment of corneal ulcers. Duke-Elder's[35] observations are that every kind of corneal ulcer responds favorably to ultraviolet radiation and that it is especially indicated in the more severe type of ulcer, such as those with hypopyon, and that there is a marked reduction in scar tissue. This agrees with my own observations[15] in experiments on corneal ulcers.

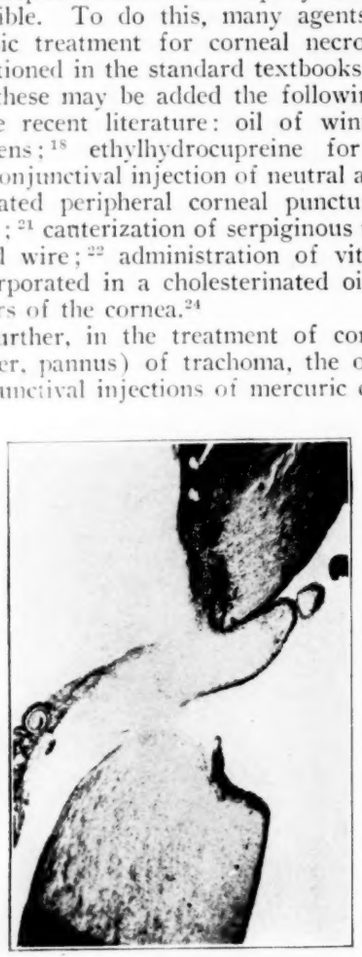


Fig. 10.—Large, untreated, perforating ulcer with loss of ocular contents. Epithelium covering edges of broken cornea and growing over fibrous exudate bridging between.

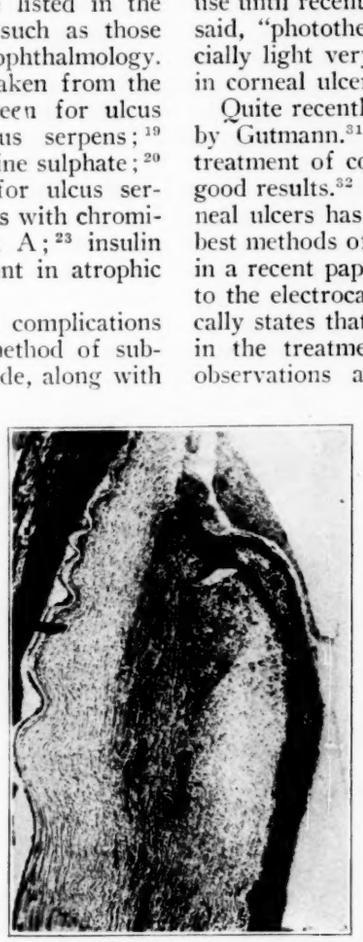


Fig. 11.—High magnification of edges of perforation (fig. 10) showing growth of epithelium, round cell infiltration and thickened Descemet's membrane.

Fig. 12.—Pannus, thickened epithelium, infiltration, and thinning of Bowman's membrane.

The Birch-Hirschfeld ultraviolet radiating lamp was used in all my cases. It is a carbon arc lamp, designed by Birch-Hirschfeld for the purpose of treating corneal disorders. The resulting ultraviolet ray is much weaker than that produced by superheated mercury lamps; therefore its application is simpler and safer. The length of the application during each treatment is from three and one-half to six minutes, and the frequency of administration is from three times a day to three times a week, depending on the infection and the amount of discharge from the necrotic surface.

18. Sabalzley, K.: Klin. Monatsbl. f. Augenh. **38**: 498 (Oct.-Nov.) 1929.
19. Rieger, Herwich: Ztschr. f. Augenh. **67**: 215 (March) 1929.
20. Perrin, Robert: Arch. d'ophth. **46**: 672 (Nov.) 1929.
21. Bruckner: Russk. ophth. J., Oct.-Nov., 1929, p. 437.
22. Vydovsky: Oft. sbornik **3**: 523, 1929.
23. Mouriquand and others: Arch. d'ophth. **47**: 727 (Oct.) 1930.
24. Kleefeld, G.: Arch. d'ophth. **47**: 647 (Sept.) 1930.
25. Mazal, C.: Oft. sbornik **3**: 431, 1929.
26. Dimulescu: Chir. méd., 1909, number 6.
27. Research department Giza mém. Ophth. Lab. Cairo, Third Ann. Rep., p. 57.
28. Wilson, D. R.: Third Ann. Rep., Res. Dept. Giza mém. Ophth. Lab. Cairo, p. 54.
29. Arruga, R.: Treatment of Corneal Ulcers, Arch. de Oftal. Hispano **30**: 327 (June) 1930.
30. Fuchs, A.: Text Book on Ophthalmology, ed. 6, Duane, 1919, p. 57.
31. Gutmann, Adolph: Phototherapy for Corneal Affections, Strahlentherapie **31**: 322 (Jan.) 1929.
32. Krasso, I.: Ztschr. f. Augenh. **71**: 1 (April) 1930.
33. Dennan, I. O.: Physical Therapy in Eye, Ear, Nose and Throat Practice, Arch. Physical Therapy **11**: 602 (Nov.) 1930.
34. Neuschieler: The Modern Therapy of Hypopyon Keratitis, Saggi. de. oftal. **5**: 316, 1930.
35. Duke-Elder, W. S.: The Radiation Treatment of Corneal Ulcers, Brit. M. J. **2**: 41 (July 13) 1929.

Complications are treated in the usual manner, such as the administration of atropine for secondary iritis, but for the corneal ulcer itself no other form of treatment is used. Many of the small simple ulcers require only one treatment, but in the case of large ulcers the treatment must be kept up until the entire necrotic area is well covered with healthy epithelium.

Careful observation is constantly made with the corneal microscope to determine the progress of healing. It has often been observed that within forty-eight hours after the first treatment of simple ulcers the entire surface is completely covered with new epithelial cells, which at first are grayish and opaque but soon become clear and transparent.

The advantage of ultraviolet treatment of ulcers of the cornea are many: It is not necessary to curette or to cauterize the ulcer, thereby destroying much healthy tissue, which is replaced with scar formation; the resulting scar is smaller and much thinner after ultraviolet treatment than with any of the classic methods; the administration of the ray is easy and simple, but careful, constant watch must be maintained throughout the treatment to obtain the best results. The treatment is not painful, and the patients are grateful for the lack of unpleasant manipulations of the eye during the procedure.

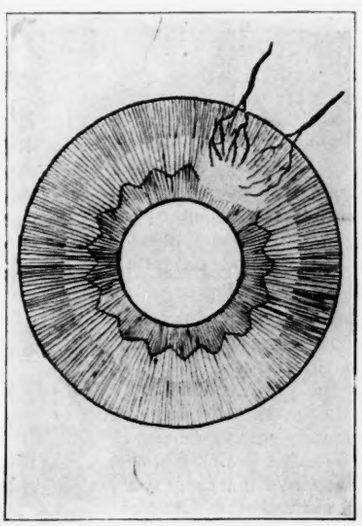


Fig. 13.—Superficial blood vessels extending to corneal ulcer.

Fig. 14.—Keratitis profunda, showing inflammatory spindles, marked infiltration in posterior layers, broken and thickened Descemet's membrane.

SUMMARY

The surface corneal epithelium is quite resistant to germ invasion, but, when infection passes the surface cells of the cornea, less resistance is encountered in the basement epithelial cells.

Bowman's membrane becomes thinner and readily disappears under the influence of active germ invasion, thus offering little resistance to its progress.

The potential lymph spaces of the corneal stroma rapidly fill with inactive or dead leukocytes and fibrous exudate, blocking the progress of repair and inviting further necrosis.

Descemet's membrane becomes thicker under the influence of inflammation and is most resistant to the process of necrosis.

Corneal necrosis is mostly due, either directly or indirectly, to bacterial invasion.

Ultraviolet irradiation is made more efficient because of the transparency of the cornea, which offers little resistance to the entrance of the ray.

Sterilization of the necrotic and perinecrotic area is most efficiently accomplished by the Birch-Hirschfeld carbon arc lamp, and regeneration of new epithelial cells to cover the area is quite rapid.

Scar formation is greatly reduced, and the resulting scar is thinner, as the result of rapid filling with epithelium, which, in a measure, prevents scar formation.

231 West Washington Street.

ABSTRACT OF DISCUSSION

DR. LUTHER C. PETER, Philadelphia: My belief is that trauma is an essential factor in the formation of ulcers. In advanced life, the period during which the incidence of corneal ulcers is greatest, a second factor should be considered; namely, lowered resistance or malnutrition. As the cornea is one of the so-called avascular structures of the eye, it is probable that ill health leads to disturbance of the corneal epithelium, which aids bacterial invasion—an insidious or obscure form of trauma or its equivalent. In the presence of normal and intact epithelium it is not likely that ulcers will develop. The extent of the injury to sight by the resulting scars, as pointed out by the author, depends largely on the depth rather than on the breadth of the necrotic area. In the active treatment of ulcers it is of greatest importance to know from smears and especially from cultures the bacteria that are active in the destructive process. With this knowledge one is fortified and prepared to meet the demands of an individual case intelligently and effectively. In the choice of the more radical measures that an active ulcer requires with either the pneumococcus or the staphylococcus as the active micro-organism, good surgical judgment is required. Two objects are sought: first, arrest of the necrotic process, and, second, recovery with a minimum amount of scar tissue. In accomplishing the first object, the second is often overlooked and serious damage to sight may result. In order to accomplish both objects, two clinical facts should be stressed: First, a patient suffering from an active ulcer is not a suitable case for an outpatient clinic but should at once be hospitalized so that he can be treated at such intervals as his case may require, or he should be treated in one's private office, where he can report two or three times daily during the active period, if the case demands it. Second, unless the tear sac is frequently irrigated and kept free from pure cultures of micro-organisms, any method of treatment is apt to yield unsatisfactory results. The author's method of using the Birch-Hirschfeld carbon arc lamp is worthy of thorough trial as less destructive than the cautery or the thermophore, and yet active in sterilizing a necrotic area. In addition to this method, I wish to call attention to pasteurization as an efficient means of stimulating normal nutritive processes without the destruction of tissue which is necessarily involved in the use of the cautery and thermophore. On the other hand, there are instances in which only the actual cautery will arrest the process. Finally, while local measures are actively employed, one should not forget that constitutional and supportive measures are indicated in most cases and in their active administration the value of local treatment is much enhanced.

DR. JOHN GREEN, St. Louis: I would modify Dr. Nugent's statement that "most corneal opacities are caused by ulceration" to "most corneal opacities that result in serious impairment of vision are caused by ulceration." It is certain that, under modern forms of treatment, the cornea, when attacked by inflammation, whether due to syphilis, tuberculosis or focal infection, exhibits a gratifying ability to rid itself of infiltrates and vascular invasions which, in the height of the process, so seriously dim the luster and transparency of this membrane. Thus, in the end, there is a return of reasonably good vision; and this is true even when the pupillary area has been invaded. I agree with Dr. Nugent that, if a necrotic mass sloughs out or is

removed and spreading infection is avoided or checked, that "healthy transparent epithelial tissue will fill the necrotic space." I cannot agree with him that "the result is very little or no opacity." While the appearance to biomicroscopy may show little change from the normal, the scar tissue that has replaced the corneal stream will forever be a bar to the best visual acuity, assuming that the ulcer lay in the pupillary zone or contiguous thereto. In cataloguing some of the recent suggestions in therapy, Dr. Nugent has failed to mention two methods, which, in my hands, have proved of utmost value: 1. Thermotherapy, under known conditions of size of applicator, degree of heat, and duration of application. This is now possible with the electrical thermophore (Shahan), originally advocated as a treatment for serpiginous ulcer of pneumococcus origin, for which it has proved eminently successful; it has also proved efficacious in the ulcer of dendritic keratitis, in ring ulcer, and in the tiny ulcer which sometimes appears at the apex of the cone in keratoconus. 2. Coverage of the ulcerated area with partial or complete conjunctival flaps. I am convinced that we should, in certain types of ulceration, fashion some form of conjunctival flap for temporary or permanent coverage of the lesion. In my hands, conjunctivoplasty has proved especially valuable in the following types of ulcer: marginal, serpiginous, hernia of Descemet's membrane (following perforation of a serpiginous ulcer), ulcer of the Mooren type, and ring ulcer. It should be adopted with confidence rather than with trepidation and not as a last resort. My experience with ultraviolet therapy is more recent and much more limited than Dr. Nugent's, but as the results were extremely favorable and the apparatus used a new one not yet on the market and not even described in the literature, it may be of interest to say a word about it. It has been developed by Dr. H. Rommel Hildreth of St. Louis and has proved remarkably effective in the treatment of a variety of corneal conditions. In my experience it has proved effective in checking promptly the circumferential extension of ring ulcers and has produced deep vascularization and eventual complete epithelization in intractable ulcers of the herpetic type.

DR. CHARLES A. BAHN, New Orleans: Several years' experience with ultraviolet therapy in more than 500 corneal ulcers of various types has convinced me that it is a valuable adjunct to other treatment, especially in the pneumococcal and herpetiform types. I have used both the Zeiss and the Bausch & Lomb lamps and found them approximately equally efficient. A word of warning, however, should be sounded in this discussion. One should not rely entirely on ultraviolet therapy, especially in the critical stage of pneumococcal ulcers, because several days' delay with thermocautery and other accepted methods will often mean the loss of an eye, even though ultraviolet treatments of the proper intensity and time are used.

DR. P. C. JAMESON, Brooklyn: There are some principles in the treatment of corneal ulcer which should be recognized, and I would mention first some structural considerations. Many ulcers have overlapping edges and before one can expect rapid recuperation they should be broken down and the ulcer beveled. I am partial to the nicking of this ringed overlap with a sharp knife to break its continuity and to permit reparative tissues from the side of the incisions to wrap round and join one another with sound tissue. Also the use of nitric acid, trichloracetic acid and the actual cautery, preferably with a blunt strabismus hook rather than the electrical cautery, which burns deeper and cannot be so easily controlled. One of the important considerations is leaving inviolate the tissues of the ulcer which show evidence of recuperation. Direct cauterizing agents or irritants should never be applied to tissues that show evidence of recuperation. Sometimes reparative granulations exist in the center of the ulcer, sometimes in the periphery, or in part of the periphery. Such areas should be carefully preserved and should never be touched or retouched with destructive counterirritants. When an ulcer becomes saucer-like with a slightly elevated periphery, and when not foul, it should be treated only with mild applications. The central residue of the ulcer may be foul and may require more than one application of a strong sterilizant and cauterizant. As the author has remarked, these discriminative observations in treatment can be viewed and applied satisfactorily through only the corneal loop, and the careful adherence to the toothpick toilet of the area of operation as advocated many years ago by Dr. Edward Jackson should be observed and will not only save much tissue but aid in the accomplishment of direct contact of the remedy. Puncture of the ulcerative area is not alone valuable in slow intractable ulcers but is especially to be advocated when internal involvement exists. The rapidity of recuperation by reduction of tension of tissues and return drainage has been amply demonstrated both by perforation and by surgical induction. As to the best manner of puncture procedure, I prefer the multiple small puncture of the ulcerative area to the single large incision looking to the diffused cicatrization which follows as protection against staphyloma. A peripheral incision of course to equalize the flow of aqueous in comparatively clean but sluggish cases is, I feel, quite helpful.

DR. OSCAR B. NUGENT, Chicago: I would like to say a word about the methods of applying ultraviolet rays. I have had experience with but one method, and that is the Birch-Hirschfeld lamp. The light is passed through a condensing lens of quartz; then it passes through a water bath, lying on each side of which is a quartz partition; then through another filter known as an uviol filter; and it is condensed by another condensing lens made also of quartz. This, necessarily, is a weaker ultraviolet ray than is produced by the superheated mercury vapor lamp. The reports I have had from the literature and also the personal communications from men who have been using ultraviolet lamps of various types are all good. Another thing I would like to make plain is that ultraviolet rays are not indicated in all corneal ulcers. If I am asked what type I use them on I say, however, all cases, even when the ulcer is due to dystrophies. Bacterial infection is likely to occur in this type of ulcer as a secondary infection, and ultraviolet treatment will control the infection if properly applied.

MECHANICAL COMPRESSION OF THE SPINAL CORD BY TUMOROUS LEUKEMIC INFILTRATION *

HANS H. REESE, M.D.
AND
WILLIAM S. MIDDLETON, M.D.
MADISON, WIS.

Acute leukemias resemble severe acute infectious diseases in being characterized clinically by a relatively sudden onset with high fever, general malaise and prostration. Pathologically, the leukemias are characterized by a tendency to necrotic and hemorrhagic processes in the mucous membranes, glands and bones. An infectious agent for the acute lymphatic and myelogenous leukemias has not been found; therefore they are considered by most hematologists as systemic diseases of unknown origin. The excessive formation of new blood cells in the leukemias is not restricted merely to hyperactive bone marrow, but emergency organs of blood cell production, such as the spleen, liver, lymph glands and even the subcutaneous tissue, are brought into activity. If one accepts the theory that multiple foci of leukemic deposits are metastases of a primary myelogenous or lymphatic disease, then the leukemias should be grouped under the heading of blastoma. The systemic expansion of leukemia has a similarity to the progressive course of lymphosarcoma, myeloblastoma, lymphozyloblastoma and chloroma. Most of the reported cases of leukemic infiltration, compressing the cord, have been chloromas. Chloromas are similar to leukemic infiltrations but, in addition, their tissue has a greenish hue which disappears after having been exposed to the air for a short time. The consensus is that chloroma and leukemia are not separate diseases;

* From the Departments of Neuropsychiatry and Medicine, University of Wisconsin Medical School.

* Read before the Section on Nervous and Mental Diseases at the Eighty-Second Annual Session of the American Medical Association, Philadelphia, June 11, 1931.

hence heterotopies are not a special feature of chloroma. The fact that the leukemias are manifested by a malignant proliferation of one type of cell supports the assumption that an unknown agent has produced a severe irritation of the blood-forming centers, resulting in blastoma-like hyperplasia throughout the system.

Clinical symptoms referable to involvement of the central nervous system in leukemia have been observed since 1824. The first pathologic reports by Eisenlohr,[1] by Mueller[2] and by Nonne[3] revealed that leukemia could produce sclerotic foci in the posterior, anterior and lateral pyramidal tracts with swelling and degeneration of the axis cylinders and proliferation of the neuroglia. Nonne's areas of fenestration or vacuolation in the cord did not have any relation to the vascular distribution. From various reports we conclude that the leukemic lesions, which are more common in the brain than in the cord, are marked by foci of infiltration with hemorrhages and necrosis, even peridural infiltration of sufficient size to cause a compression syndrome. The paraplegic manifestations resulting from peridural leukemic infiltrations are not so uncommon, although they have received comparatively scant attention in the literature, perhaps through incorrect evaluation of the etiology of paraplegia.

In 1917, Peter Bassoe[4] gathered and published the reports of cases of paraplegia proved at necropsy to have been caused by leukemic infiltration or chloroma in the spinal canal. To the reports of cases that had thus far accumulated he added one of his own. Bassoe believes that the paucity of reports of leukemic infiltration causing cord compression is to be explained by the fact that they have been described under that disease of the hematopoietic system known as chloroma.

Dock and Warthin[5] in 1904 reported twenty-two cases, nine of which presented involvement of the vertebrae "usually in the periosteum of the bodies, sometimes in the dura, sometimes in the fat of the vertebral canal" with atrophy and degeneration of the cord.

Among the outstanding contributions to the literature of spinal cord symptoms in chloroma and leukemia since Bassoe's[4] article are the reports of Heissen,[6] of Weil and Davison[7] and, finally, of Critchley and Greenfield.[8] The latter authors classify the paraplegic manifestations in chloroma and leukemia under seven headings based on the anatomic location of the tumor: (1) localized or diffuse leukocytic infiltration of the spinal cord; (2) localized or widespread softening of the spinal cord; (3) hemorrhage into the spinal meninges; (4) infiltration of the spinal meninges by leukocytic or chloromatous masses; (5) infiltration of the spinal nerve roots; (6) infiltration of the peripheral nerves of the lower extremities; (7) manifestations of subacute combined degeneration of the spinal cord occurring in association with leukemia.

A review of the literature reveals that the most common form of paraplegia in leukemia is due to epidural or peridural infiltration. Softening of the spinal cord with leukemic infiltration in the form of leukoma has been recorded by Baudouin and Parturier[9] as well as by Spitz.[10] The softened areas are reported as resembling inflammatory myelitic foci without inflammatory exudates or reactions, but they have revealed alterations and occlusion of spinal vessels with myelomalacia.

Summarizing the cases reviewed in detail by Bassoe,[4] we find that the majority of them occurred in young boys and that they all terminated fatally in from two to four months after the onset of acute symptoms. In the cases reported by Critchley and Greenfield,[8] including four cases of their own, fourteen occurred in males and three in females. The average age was 20.6 years.

Children and young adults presenting a symptom complex of paraplegic pseudoparalysis or complaining of painful conditions of the vertebral column should be examined for leukemia, the possibility of an aleukemic state being kept in mind. The paraplegias resulting from infiltrating masses of the peridural tissues do not differ from the known syndrome of spinal paraplegia. The first symptoms are persistent pain in the back, usually of sudden onset, radiating intermittently into the legs or girdle-like as in gastric crises. The lower extremities become heavy and stiff because of hypertonicity, and a spastic paretic gait is seen. The paravertebral muscles and the vertebrae are hypersensitive to pressure and percussion. This period of posterior root irritation ushers in the phase of progressive cord compression with paraparesis, segmental sensory disturbance, bladder retention and rectal incontinence, until a complete compression syndrome associated with trophic disturbances results. Rapid loss of weight, rise in temperature and severe prostration are important factors in differentiating clinically paraplegias of leukemic character from cases of cord compression due to other tumors. The initial blood pictures are not always indicative of the true illness, but soon the typical alteration and increase of blood cells makes the diagnosis certain. Spinal fluid examination with manometric studies is imperative in order to demonstrate the serologic changes and the compression syndrome. The cells of the spinal fluid should be examined in stained smears because pathologic cell forms may suggest the nature of the compressing agent.

Case 1 falls into the chloroma group, in that it occurred in a boy in whom the acute leukemic blood picture developed in the terminal course of his disease and in whom at necropsy various tissues were found to contain infiltrations of leukemic character which had a greenish hue. It is to be added, on the other hand, to the cases of "nonpigmented" leukemic infiltrations already reported in the literature, for the peridural tumor found at necropsy was pink, with no suggestion of the grass green color of a chloroma.

Case 1.—R. P., a white school boy, aged 13, who was admitted to the Wisconsin General Hospital, Sept. 20, 1929, because of an inability to move his legs, had enjoyed good health until about June 1, when he remarked a transient interscapular pain on rising, the subsidence of which was followed at times by intermittent, dull, aching pains in the back. Not until August 25 was there noticed any disability in the legs; it was first revealed by a heaviness in both legs and an inability to "pick them up." By September 16 he was unable to move

1. Eisenlohr, C.: Neuropathologische Beobachtungen, Virchows Arch. f. Path. Anat. **73**: 56-73 (May) 1878.
2. Mueller, W.: Inaugural Dissertation, Berlin, 1895, cited by Nonne (footnote 3).
3. Nonne, M.: Ueber Degenerationsherde in der weissen Substanz des Rückenmarkes bei Leukämien, Deutsche Ztschr. f. Nervenh. **10**: 167-173 (April 30) 1897.
4. Bassoe, Peter: Leukemic Infiltration in the Spinal Canal as a Cause of Paraplegia, J. Nerv. & Ment. Dis. **47**: 180-190 (March) 1918.
5. Dock, George; and Warthin, A. S.: A New Case of Chloroma with Leukemia, Tr. A. Am. Phys. **19**: 64-72, 1904.
6. Heissen, F.: Chloroma und Nervensystem, Ztschr. f. d. ges. Neurol. u. Psychiat. **95**: 248-306, 1925.
7. Weil, Arthur; and Davison, Charles: Changes in the Spinal Cord in Anemia, Arch. Neurol. & Psychiat. **22**: 966-1001 (Nov.) 1929.
8. Critchley, McDonald; and Greenfield, J. G.: Spinal Symptoms in Chloroma and Leukemia, Brain **53**: 11-36 (April) 1930.
9. Baudouin, A., and Parturier, G.: Sur les complications nerveuses des leucémies, Rev. neurol. **18**: 673, 1910.
10. Spitz, R.: Zur Kenntniss der leukaemischen Erkrankung des Centralnervensystems, Deutsche Ztschr. f. Nervenh. **19**: 467-481 (July) 1901.

the right leg at all and was able to move the left only slightly. At the time of his entrance to the hospital, neither leg could be moved by the patient. Accompanying this progressive paraplegia there had been intermittent dull aching in the back and legs. Since August 25, jaundice with some upper abdominal discomfort had been noted. Occasionally dull headaches had been present. One attack of vomiting had marked the onset of icterus, which, according to the observation of the patient, was decreasing slowly but steadily. Since June 1, constipation

Fig. 1 (case 1).—Extensive peridural leukemic infiltrations with hemorrhages in the tumorous mass.

had necessitated mild laxatives. An inability to void urine was first noted, September 17, and from the 19th catheterization was regularly required.

The past medical history revealed the occurrence of measles, whooping cough and chickenpox without complications, and beyond these so-called minor communicable diseases of childhood no period of illness or bedfastness had been experienced.

On physical examination, the following pertinent conditions were apparent: fair nutrition and development; icteric skin, sclerae and mucous membranes; blurring of the margins of the optic disks, with glistening white appearance extending into the retina; peculiar pegging of the central incisors; hypertrophic cryptic tonsils; palpable anterior cervical lymph nodes; slight lag of the respiratory excursion at the left apex with increased vibratory phenomena but no râles; blood pressure 120 systolic and 86 diastolic; liver palpable from 3 to 4 cm. below the right costal margin in the midclavicular line; spleen palpable; tenderness to percussion over the upper thoracic vertebrae.

Neurologically, the patient exhibited flaccid paralysis of both legs and an irregular sensory involvement distal to the level of the ninth dorsal vertebra, including a spotted loss of tactile discrimination, localization and vibratory sense. Cephalad to this, between the third and ninth dorsal vertebrae, there was a zone of hyperesthesia. The deep tendon reflexes were active, except the knee-jerk, which varied from day to day, being hyperactive on some occasions and absent on others. A Babinski reflex could be secured bilaterally at all times. There were sphincter disturbances and urinary retention. Irregular low grade fever fluctuating between 98 and 100 F. was constant. September 21, blood examination showed an inversion in the usual ratio existing between neutrophils and lymphocytes; hemoglobin was 65 per cent; color index, 0.6; erythrocytes, 5,000,000, and leukocytes, 5,100, with a differential count of 28 per cent neutrophils, 2 per cent eosinophils, 63 per cent small lymphocytes, 6 per cent large lymphocytes and 1 per cent, large mononuclears.

Spinal puncture, September 21, yielded a straw colored fluid under slightly increased pressure at the start, which decreased rapidly and exhibited spontaneous coagulation. The Wassermann reaction was negative; the colloidal gold curve was 0000123443; globulin, 4+; urobilogen, negative, and cells were absent. The Queckenstedt sign was negative.

To establish the extension of the obstruction, a cisternal puncture was done, October 2. The fluid was clear but under definitely increased pressure. Two cubic centimeters of iodized poppy-seed oil 40 per cent was injected. Roentgen examination showed that the oil could be visualized in the upper part of the dorsal spine, with a complete arrest at the level of the superior surface of the fourth thoracic vertebra. The lower pole of the oil silhouette was ragged, suggesting an irregular obstruction at the fourth thoracic vertebra. No trace of iodized oil was visualized distally.

It was not until October 3 that the leukopenia gave way to a leukocytosis and a true leukemic blood picture developed, as follows: hemoglobin, 74 per cent; erythrocytes, 4,350,000, and leukocytes 26,100, with a differential count of 4 per cent neutrophils, 38 per cent small lymphocytes, 55 per cent large lymphocytes and 3 per cent large mononuclears.

Thus, with the attention focused on the shifting blood count, a reevaluation of the observations led to a diagnosis of acute lymphatic leukemia with leukemic compression of the spinal cord.

The accompanying table gives a graphic account of the progress of the disorder.

The patient died, October 15, approximately three months after the onset of acute symptoms. Necropsy was performed at once. Anatomic examination revealed lymphatic leukemia with enlargement of the mesenteric nodes; infiltration of the kidneys, spleen and pancreas; petechial hemorrhages on the epicardial and pleural surfaces and within the pulmonary substance; obstruction of the intrahepatic bile duct; suprapubic cystostomy with hematoma of the abdominal wall, and hemorrhagic cystitis. The liver was a mottled green, and the cut surface showed a greenish hue with accentuation of normal markings. The pancreas was adherent to the surrounding structures; it was enlarged, firm and nodular, and its cut surface was pale green. All the mesenteric nodes were enlarged

Course of Acute Lymphatic Leukemia in Case 1

	Red blood Cells	Hemoglobin	White Blood Cells	Neutrophils	Eosinophils	Lymphocytes	Large Mononuclears	Myeloeytes	Lymphoblasts	Immature Neuroblast	Myeloblasts
9/21	5,000,000	65	5,100	28.0	2	69.0	1.0	...	..	...	...
10/ 3	4,350,000	74	26,100	4.0	..	93.0	3.0	...	..	...	...
10/ 4	4,390,000	75	23,600	1.0	..	99.0	...	...	..	...	...
10/ 5	4,050,000	60	22,900	8.5	..	90.5	0.5	0.5	..	...	...
10/ 9	.....	..	37,100	1.0	..	89.0	1.0	...	9	...	...
10/11	2,820,000	40	35,400	0.5	..	81.5	...	...	..	16.5	0.5
10/14	1,210,000	20	112,750	1.0	..	88.0	...	...	..	11.0	...
10/15	.....	10	173,600	1.5	..	94.0	...	4.5	..	...	...

and soft. From the second to the fifth thoracic level there was extradural growth which was homogeneous and friable. It was distinctly pink and it surrounded the cord posteriorly and laterally but did not completely encircle it (fig. 1). The vertebrae in this region of the new growth were not eroded. The dura was markedly thickened and was firmly adherent to

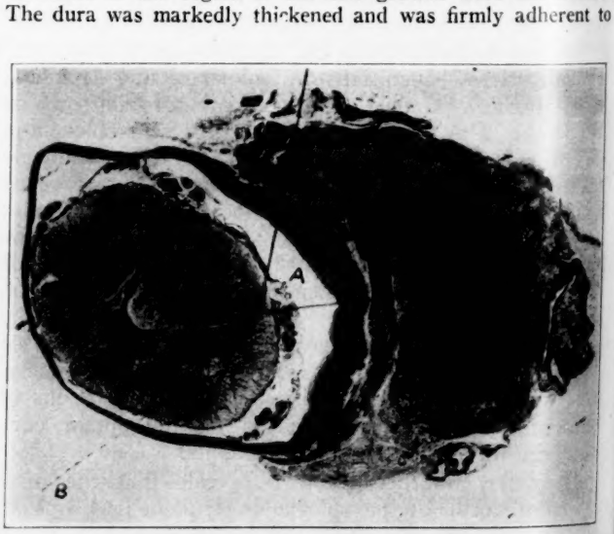


Fig. 2.—Low power magnification of cross section, showing massive accumulation of leukemic infiltration posteriorly and laterally; epidural infiltration and thickening of meninges, and numerous areas of fenestration within cord.

the bodies of the third, fourth and fifth thoracic vertebrae. The tumor mass could be traced along the nerve roots through the intervertebral foramina. The inner surface of the dura was pink and was adherent to the cord on the lateroposterior side (fig. 2). At the level of the most extensive infiltration the cord was somewhat flattened, soft and pale, whereas, above and below, it retained its normal consistency. Cross section

of the cord at the level of the fourth and fifth thoracic vertebrae showed a loss of normal anatomic markings.

Histologic examination revealed a peridural tumor consisting of lymphoid tissue with many macrophages. The lymphoid sinuses, many of which were enlarged, were filled with cells. The reticulo-endothelial cell lining of the sinuses exhibited considerable mobilization and proliferation. The tumor tissue proper was made up of small and large lymphocytes and lymphoblasts, with here and there larger cells containing granules.

Fig. 3.—Higher magnification of *A* (fig. 2). The leukemic infiltration has invaded the dura following the vessels and has produced a reactive enlargement of the dura with localized leukemic deposits, and has infiltrated the meninges.

Within the thickened dura were areas of tumor cell accumulations and hemorrhages about blood vessels, spreading out and infiltrating, tumor-like, the medial dural sheath (fig. 3). There was chromatolysis of some of the anterior horn cells. At the level of the fourth and fifth thoracic vertebrae, Nonne's [3] fenestration was seen in the right lateral and posterior tracts extending to, but not involving, the gray matter. Vacuolation, surrounded by many swollen axons, and incomplete destruction of the axis cylinders and myelin sheaths were other changes noted (fig. 4). The latter areas were in the vicinity of blood vessels but were not perivascular. There was no tumor infiltration of the cord.

The explanation for Nonne's areas of fenestration is not clear. The fact that the tumorous masses obstructed the intervertebral foramina, compressing nerve roots, segmental arteries and veins, thus depriving the cord of blood supply, offers an explanation. Early thrombus formation by degenerative changes in the walls of the vessels is another explanation (Critchley and Greenfield [8]). We are, however, of the opinion that this vacuolation or fenestration results from an interference with the free movement of the fluid constituents of the cord by compression leading to a variably severe edema (Hassin's hydrops theory).

CASE 2.—A. B., a man, aged 51, a faculty member of the University of Wisconsin, was first seen in the outpatient department of the hospital, Aug. 16, 1926, with an indefinite complaint of "feeling unwell." Three years previously he had first noticed enlargement of the cervical lymph nodes. An extraction of an affected tooth had led to reduction in this swelling. Several relapses in this local condition, however, had occurred in the interval prior to the consultation. A "kink" in the neck had likewise persisted. In February, 1926, while he was receiving electrical treatment for this condition at the hands of a physician, an excessive current was accidentally passed through the patient, rendering him unconscious for half an hour. When he awakened a flaccid tetraplegia was present for an undetermined but rather short time. Under massage and exercises he recovered completely. Subsequently he experienced generalized body pain. Putting on a coat or taking a deep breath was extremely painful. In December, 1926, he fell on a slippery pavement, striking the back of his head, and again he became paralyzed from the neck down for several hours. Chiropractic treatments, he reported, were followed by improvement in his condition within two months, so that he was able to attend to his duties at the university. August 16, he was referred to us because it was thought that the electrical shock was responsible for his transient paralysis and intermittent weakness (Langworthy's changes in nerve cells from electrical injury).

Physical examination revealed at that time fair development and nutrition; a rather sallow complexion; moist, clammy skin; eccentric pupils, reacting well to light and in accommodation; fibrillary tremors of the tongue, with a mild atrophy of the papillae; cervical glandular enlargement on the left; tremor of the fingers; questionable quadriceps weakness; increased reflexes with a bilateral Babinski reflex and sustained patellar and foot clonus; normal gait; perfect equilibratory and static functions; no disturbance of sensation. Examination of the blood revealed hemoglobin, 81 per cent; erythrocytes, 4,970,000, and leukocytes, 6,000, with a differential count of 64 per cent polymorphonuclears, 35 per cent small lymphocytes, and 1 per cent large lymphocytes. The Wassermann reaction was negative. Urinalysis showed normal conditions. The involvement of the cerebrospinal tracts with the tongue changes suggested pernicious anemia. The patient was not seen again until May, 1927, when he consulted us with complaints of a bandlike constriction about the chest, clumsiness and weakness in the extremities, especially in the legs, and numbness in the fingers and the lower extremities. The past medical, social and family history added no important details. At physical examination the following pertinent observations were established: a greatly reduced state of nutrition; clammy skin; sallow complexion; atrophic nasal mucosa; atrophy of the papillae of the tongue with fibrillation in the tongue muscles; first mitral sound slurred; second pulmonic sound accentuated; blood pressure 135 systolic and 92 diastolic. The head was held forward by fixation of both sternocleidomastoid muscles and was limited in extension backward. The lateral motions were unimpaired. The cervical vertebrae, from the sixth to the eighth, especially the seventh, were sensitive to pressure and percussion. The spinous processes were in the midline. The cranial nerves were normal including those of smell and taste. Expansion of the chest was greatly limited because of impairment of the intercostal muscles. The respiration was abdominal in character. The liver and spleen were just palpable. The right testicle was diffusely enlarged to egg size, of soft consistency but not tender. The muscle status revealed some atrophy of the shoulder girdle and arms, especially

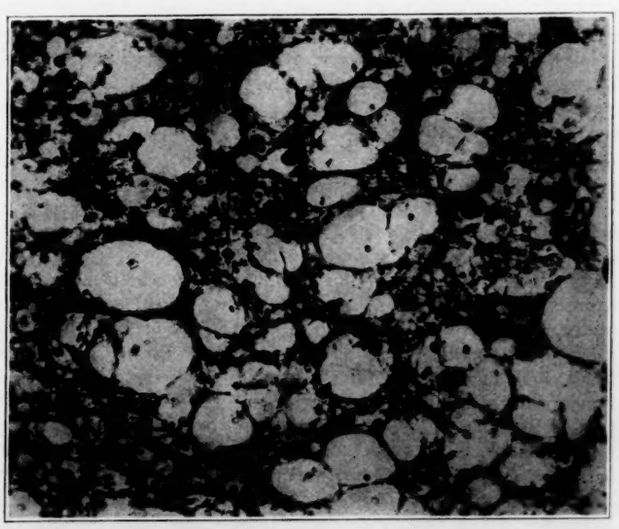


Fig. 4.—Intramedullary area of fenestration into region of left cerebrospinal tract, demonstrating changes of axon and vacuolation.

marked in the small muscles of the hands. The muscular wasting of the lower extremities was less definite. There was a suggestion of bilateral wrist drop, more marked on the right. All tendon reflexes were exaggerated, with bilateral Babinski reflex and clonus. The gluteal and thigh muscles presented muscular fibrillations. The muscle tone was somewhat increased in the legs. Abdominal, cremasteric and plantar reflexes were absent. Sensation revealed spotty areas of hypesthesia below the seventh and eighth dorsal vertebrae. Pain and temperature sensations were impaired from the fourth dorsal vertebra distally, and were more marked over the trunk than over the extremities. Muscle and joint sense was essentially normal. Vibratory sense was impaired in both hands and in the feet—in the right foot more than in the left. The gait was stooped, with spastic paretic features. Roentgenograms of the spine showed normal conditions. The Wassermann test and chemical analysis of the blood gave negative results. Lumbar puncture revealed a clear fluid without a suggestion of a compression syndrome. The spastic paretic tetraplegia with definite atrophies in the upper extremities and the paresis of the intercostals was ascribed to a lesion of the cervical cord extending from the fourth to the seventh cervical vertebrae. Cisternal puncture was performed, and iodized oil was injected. Roentgenograms thereafter demonstrated a complete riding block at the third cervical vertebra. The oil did not produce local irritation. Repeated examinations did not reveal a sensory level. Laminectomy (Dr. F. J. Gaenslen) was performed, Aug. 24, 1927. The dura was found to be pulsating above the tumor at the second cervical vertebra and below at the seventh. An elongated, reddish brown extradural tumor was removed (fig. 5). The cord was definitely flattened, soft and pale. The tumor masses followed the posterior nerve roots into the intervertebral foramina. Naturally, the infiltrating tissue could not be completely removed. The pathologic report (Dr. W. D. Stovall) showed a very cellular tumor which was composed of small and large lymphoid cells with some dense fibrous tissue and was reported as a lymphosarcoma.

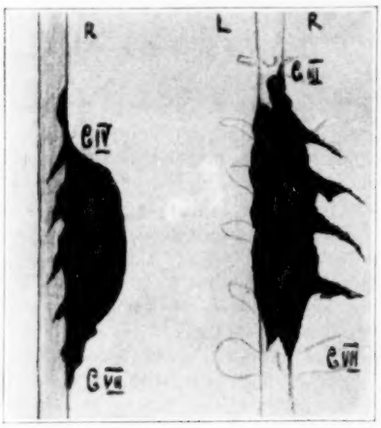


Fig. 5 (case 2).—Lymphosarcoma compressing the cervical cord.

Recovery was uneventful, and the patient was discharged in September, 1927. Following the operation he received high voltage roentgen therapy and was able to resume his activities in October, 1927, free from symptoms. Repeated neurologic examinations were normal. Blood counts revealed a moderate increase in the total number of cells, and at this time the differential count showed 49 per cent neutrophils, 50 per cent small lymphocytes, and 1 per cent large lymphocytes. The temperature was normal. In February, 1929, he was readmitted to the hospital because of shortness of breath and pain in the chest. He had been bedridden since the middle of January because of general weakness and swelling of the lymph glands. A perforated nasal septum with mucoid bloody discharge developed. The neurologic examination gave entirely negative results. The blood examination at this time showed hemoglobin 67 per cent, erythrocytes 4,260,000, and leukocytes 5,600, with a differential count of 82 per cent polymorphonuclears and 18 per cent small lymphocytes. The final course was a rapid progressive decline. Permission for a postmortem examination was not obtained.

This case does not fall definitely into the group of leukemias, being diagnosed from the tissue as lymphosarcoma, but presents a suggestive blood picture of an aleukemic phase of lymphatic leukemia. The similarity to acute leukemic infiltration compressing the cord permits certain deductions. In both cases the posteriorly situated blastomas surrounded the sensory roots and obstructed the intervertebral foramina. If the cord changes were the result of ischemia alone due to compression of the intervertebral arteries and veins, the second case could not have become clinically normal. The long duration of a compression of the epidural cord, with obstruction of the intervertebral foramina and the disappearance of clinical manifestations after removal of the main growth, suggests that only peridural tumorous infiltrations involving the medial dural sheath sufficiently will give rise to the microscopic structural changes seen in case 1. Such a leukemic pachymeningitis is more apt to prevent elimination of cord fluids, and supports our idea that an edema will produce structural alterations, degenerations and vacuolation.

CASE 3.—L. R., a man, aged 29, a chauffeur, was admitted to the hospital, Feb. 1, 1931, with a painful swelling on the left side of the neck. Dec. 20, 1930, he had contracted a "cold" with elevation of temperature and general malaise which persisted until the time of entry. After Christmas the left ear began to ache, with subsequent progressive deafness, associated with headaches and tender swollen anterior cervical glands. Over the body appeared multiple painless nodules, ranging in size from a split pea to a fifty-cent piece (about 30 mm), with a large fluctuating nodule on the right side of the skull, confluent enlargements in the right groin, and definite painless swelling of the right testicle. Except for dyspnea on exertion, dizziness, tinnitus, palpitation of the heart, and chronic nonproductive cough with night sweats, there were no other complaints. The past medical history was without significance. The patient was married and had one healthy child.

Physical examination showed that the patient, who was acutely ill, was well developed and well nourished. The skin and mucous membranes showed definite pallor. The right temporal veins were enlarged. Multiple nodules were located in the subcutaneous tissue covered by a bluish-red skin (fig. 6). Examination of the chest revealed dulness over both apexes, with bronchovesicular breath sounds and dulness with an almost absent tactile fremitus at the right base. The heart was not enlarged and there were no murmurs; the blood pressure was 110 systolic and 75 diastolic. The liver and spleen were enlarged and tender. Rectal examination was normal.

Fig. 6 (case 3).—Acute lymphatic leukemia with leukemia cutis and peroneal palsy.

Examination of the blood revealed hemoglobin, 70 per cent; erythrocytes, 5,190,000, and leukocytes, 49,900, with a differential count of 31 per cent neutrophils, 57.5 per cent small lymphocytes, 7.5 per cent large lymphocytes, 2 per cent large mononuclears, 2 per cent young neutrophils, and platelets, 110,000. The Wassermann reaction was negative. Chemical analysis of the blood showed sugar, 80 mg.; nonprotein nitrogen, 42.8 mg. per hundred cubic centimeters of blood; basal metabolic rate, +25, +22, +21; blood cultures, negative.

Urinalysis showed normal conditions. The temperature ranged from 98 to 99.4; the pulse rate averaged 96.

A clinical diagnosis of acute lymphatic leukemia with leukemia cutis was confirmed by the pathologic report on excised nodules.

February 23, a definite weakness without paresthesias developed in the right leg. A steppage type of gait developed, owing to a definite foot drop. Neurologic examination revealed a markedly reduced state of nutrition, with multiple leukemic lesions in the skin. The cranial nerves were normal, including the visual fields and eyegrounds, but the left cochlear nerve was definitely impaired, resulting in deafness on that side. Muscle volume was reduced throughout. The peroneal muscles on the right were tender to pressure and somewhat flabby. The muscular power of these peroneal muscles was definitely reduced, giving rise to a foot drop. The right patellar reflex was decreased. Electrical examination gave negative results. Whereas the sciatic nerve was not sensitive to pressure, the right peroneal nerve was very sensitive in the region of the capitulum fibulae. There was no induration of the skin in this area, and no nodules could be felt along any nerve. There was no muscular fibrillation. The other neurologic conditions were normal.

The patient received splenic extract intramuscularly and high voltage roentgen therapy. During the course of irradiation the white cell count fell from a level of 90,000 to 18,000. The patient requested his discharge, February 26. For three days following his discharge he felt fine, but since February 26, he had been having difficulty with respiration. A dull ache in the lower portion of the right lung and a painful sore throat, with severe headaches, made readmission necessary, March 10. There was a mucoid discharge tinged with blood from the nose. The left arm was edematous and very sensitive. Examination revealed an enlargement of the previously described nodules, which were a deeper reddish blue and as large as a good sized walnut. The gums were swollen and purplish red, and they bled easily. A large ulcerated nodule had developed on the gums of the left jaw. Besides the new development of many nodules, petechiae were seen over the chest and abdomen. The blood count revealed hemoglobin, 30; 547,000 white cells with a differential count of 99 per cent lymphocytes, 0.25 eosinophils, and 0.75 neutrophils. Studies of blood smears revealed more immature forms than previously. During the final stage, the blood picture showed a steady decrease in the number of white cells until, shortly before death, the white count ranged from 6,000 to 10,000 with practically normal differential percentages. Several new cutaneous nodules had appeared over the skin, and the older nodules had increased in size. The hyperplasia of the lymphoid tissue within the mouth and throat progressed with bleeding from the mouth, throat and nose. The patient died, May 13. The temperature during the second admission averaged 100, and the pulse rate varied between 110 and 120, with respirations averaging 24.

This case is reported mainly because it falls under the sixth heading of Critchley and Greenfield's classification. It also demonstrates the clinical variations of acute leukemias with multiple leukemic nodules in the subcutis and mucosal membranes. The absence of visible and palpable leukemic nodules along the nerves, and especially along the distribution of the peroneal nerve, suggests a localized leukemic infiltration of a peripheral nerve in the lower extremities. Such an infiltration of the nerves is called leukoma and has been more frequently reported in the brain.

ABSTRACT OF DISCUSSION

DR. GEORGE B. HASSIN, Chicago: Leukemic cord lesions are often located outside the dura, and in many such cases the spinal cord appears entirely normal macroscopically, without signs of pressure or compression; yet the clinical picture is one of paraplegia. In the cases of Reese and Middleton, for instance, cord infiltrations that could be responsible for the clinical picture are not present, nor are there other phenomena that would indicate that the spinal cord had been compressed directly or indirectly. The microscopic pictures, however, show beautifully, at the level of the leukemic infiltrations, marked phenomena of rarefaction. No signs of secondary degeneration or of a mass nerve destruction above or below the seat of the infiltration are present. The rarefaction causes nerve destruction and is one of the remarkable pathologic features of leukemic cord lesions. As I understand it from my pathologic studies and as I have repeatedly emphasized, the rarefaction is the result of stagnation of the tissue fluids in the spinal cord. Being normally discharged by the way of the perineurial root spaces, they are kept back by the infiltrations obliterating the latter and thus result in rarefaction. Cases such as have been presented by Reese and Middleton have a tremendous physiologic importance, as they throw some light on the mechanism of absorption of the cerebrospinal fluid.

DR. TEMPLE S. FAY, Philadelphia: On the question of diagnosis in some of these spinal compressions, perhaps the only factor that I might add to the discussion is that I still rely a great deal on the vasomotor sign, which was presented several years ago and which I have found confirmed in two compression cases. I have had no experience to offer in this group and can only say that early root signs are usually invisible by vasomotor reaction.

DR. JAMES W. KERNOHAN, Rochester, Minn.: These two cases of compression of the spinal cord by leukemic infiltrations are unusual. The condition simulates tumors arising from the dura or metastatic lesions. A more common picture seen is that of multiple small foci in the central nervous system; the picture is different from that of multiple sclerosis or any of the other degenerative conditions, and in all probability the foci are due to infarcts. Frequently a small vessel is occluded with leukemic cells, and no perivascular collections of cells are around the vessels. The condition seems to be edema with some extravasated erythrocytes. Should the patient survive long enough at this terminal stage, degeneration of the myelin sheaths and the axis cylinders will ultimately be found. But at the stage to which I refer I do not find degeneration of either the myelin sheaths or the axis cylinders; neither do I find the condition which Reese and Middleton have described.

DR. JAMES AYER, Boston: Were there no cells in the spinal fluid at the time you examined it?

DR. HANS H. REESE, Madison, Wis.: No.

DR. AYER: There probably would have been if the type had been such as Dr. Kernohan has described. That is an entirely different pathologic question.

DR. HANS H. REESE, Madison, Wis.: The average duration of these leukemic infiltrations is five months, starting with the supraclavicular point, or higher up even, if infiltration is far below. As to the symptoms, one day there is no reflex; the next day there is. The blood picture changes constantly until one has a typical acute lymphatic leukemia.

Peptic Ulcer and Tuberculosis.—Fifteen years after Cruvelhier's original description of gastric ulcer, von Jaksch, in 1844, reported that of his patients afflicted with gastric ulcer one fifth were tuberculous. Dittrich, the same year, mentioned a similar connection. Nine years later, Engel found 19 per cent. In 1864, Brinton quoted these figures but felt that the association of gastric ulcer with other diseases is "in proportion more akin to their known frequency than to other of their circumstances." He pointed out that deaths from phthisis are rather more than 18 per cent of deaths from all diseases in persons over 20 years of age. Leube, in 1876, commented on this association and quoted von Jaksch, Dittrich and the figures of Steiner, who found phthisis 33 times in a series of 110 necropsies in which open and healed gastric ulcers were found. . . . A review of the literature on the association between peptic ulcer and tuberculosis is given, showing great difference of opinion. Figures obtained from a study of 7,700 necropsies at Bellevue Hospital are presented, which reveal a definitely increased frequency of peptic ulcer in tuberculosis. This frequency is shown to be statistically sound.—Sturtevant, Mills; and Shapiro, L. L.: Peptic Ulcer: Association with Pulmonary Tuberculosis, *Arch. Int. Med.* **48**:1198 (Dec.) 1931.

Clinical Notes, Suggestions and New Instruments

IMPROVED STETHOSCOPE FOR OBSTETRICIANS

B. B. WECHSLER, M.D., PITTSBURGH

This instrument embodies an improvement in structure over the stethoscope now in use by obstetricians. It is especially of greater advantage in the delivery room because it is arranged so that there is no obstruction to view, and because of the absence of tubing hanging down in front of the face and adventitious sound, usually caused by the contact of the tubing with the sheets or drapes of the patient. This also eliminates the risk of contamination of the sterile drapes by stethoscope tubing.

Stethoscope for obstetricians: old type at left, author's modification in center, and sterilized part of bell being attached at right.

The shaft of the stethoscope has been lengthened to 5½ inches in order to make its use more comfortable to the obstetrician and to lessen the risk of contamination.

The bell of the stethoscope has a detachable end, which is of the usual screw type and made of metal so that it can be sterilized and attached by the obstetrician with his sterile gloved hand, if he desires to obtain knowledge of the condition of the fetal heart during delivery, through the sterile drapes.

The accompanying illustration shows, at the left, the old type now on the market, having the tubing hanging down in front of the face, the ear attachments fitting in from the front; in the center, the modification, bringing the tubing over the headpiece and the ear attachments coming from behind the head; at the right, the sterilized part of the bell being attached by the obstetrician with his sterile gloved hand.

3401 Fifth Avenue.

AN UNUSUAL MANIFESTATION OF EMBOLISM *

OSCAR SWINEFORD, JR., M.D., UNIVERSITY, VA.

Thrombosis and embolism are common pathologic phenomena. Among the more common sites of thrombus formation is the region of the apex of the left ventricle. Emboli originating here may lodge in any artery, large or small. Because it is rare, if not unique, it is felt that this case of multiple emboli in the aortic sinuses of Valsalva (complicating acute bacterial endocarditis with mural thrombosis of the left ventricle) should be reported:

V. W., a white girl, aged 4 years, was admitted to the University of Virginia Hospital on account of extensive purpuric hemorrhages. The history, given by the mother, was that the child, who had always tired easily, had cut her foot nine days before admission. The next day both feet were swollen and there were red areas on her legs, possibly lymphangitis. The edema and red areas had disappeared and the lesion on her foot had healed when the hemorrhages into the skin appeared on the day of admission.

Physical examination disclosed marked air hunger, thirst, pallor of the skin and of the mucous membranes, and extensive deep purple hemorrhagic areas over both shoulders and hips, much more marked on the right. The temperature was 100, pulse 125, and respiration 26. Systolic and diastolic murmurs were heard. They were loudest in the third and fourth interspaces just to the left of the sternum. The diastolic murmur was described as being peculiarly soft and low pitched, lasting through early diastole and mid-diastole. It was not heard immediately following the aortic second sound as in the case of most murmurs of aortic regurgitation. The systolic murmur was also soft. A pericardial friction rub was also detected in the third left interspace. The heart was enlarged downward and to the left. The blood pressure was 80 systolic and 20 diastolic.

Laboratory examination showed: leukocytes, 35,000; erythrocytes, 3,000,000; hemoglobin, 40 per cent; blood platelets, 75,000; reticulocytes, 0.6 per cent; bleeding time, fourteen minutes, and clotting time, ten minutes. The blood smear was that of severe secondary anemia. There were no abnormal leukocytes. The Wassermann reaction was doubtful. The urine contained innumerable hyaline and finely granular casts, and from 15 to 20 leukocytes to the high power field.

The patient was given a small transfusion promptly. There was no reaction. Several hours after her admission the air hunger became more marked. Respiration ceased about thirty minutes later.

The clinical diagnosis was symptomatic purpura, pericarditis and, probably, bacterial endocarditis.

Autopsy.—The body was well developed and well nourished. There was extreme pallor of the skin and mucous membranes. There was a large purple area (20 by 20 cm.) over the right shoulder and axilla, and another over the right hip and buttock. There were corresponding but smaller areas on the left. These areas represented extensive hemorrhages into the skin, subcutaneous tissues and underlying muscles. There were no petechial hemorrhages in the fingers, conjunctivae or soft palate.

The heart weighed 112 Gm. There was a little early fibrinous pericarditis around the conus arteriosus and at the tip of the left ventricle. A number of petechial hemorrhages showed beneath the anterior visceral pericardium. There was very early verrucous endocarditis of the posterior mitral cusp, and thin fibrin deposits were seen in three small areas of the adjacent auricular endocardium. There was a mural thrombus in the apex of the left ventricle. The striking thing was the finding of three emboli tightly wedged in, but not adherent to the posterior cusp of the aortic valve. There was another embolus in the anterior cusp which, however, was loosely adherent. Neither coronary orifice was occluded. These emboli were similar in color and consistency to the mural thrombus in the apex. Long chain Streptococcus viridans was grown in pure culture from the blood in the right auricle.

1, three emboli wedged into the posterior aortic sinus of Valsalva; 2, one embolus in the left anterior cusp; 3, the mural thrombus.

The lungs, liver, spleen, kidneys, serosae, pancreas, suprarenals and intestines were not significantly abnormal.

* From the Department of Pathology, University of Virginia Medical School.

The anatomic diagnosis was acute bacterial endocarditis with mural thrombosis and embolism.

COMMENT

Emboli in the aortic sinuses of Valsalva are rare if not unique. They originated in a mural thrombus at the apex of the left ventricle. It is surprising that more such cases are not on record, especially since mural thrombi in the left side of the heart are common and coronary emboli are not rare.

It is probable that the emboli were discharged from the ventricle too late in systole to be carried out of the ascending aorta and were consequently wafted back into the sinuses of Valsalva by the aortic reflux, which floats the valve cusps into their closed diastolic position. It is unlikely that the emboli were too large to be carried by the aortic stream during the first half of systole.

The sharply demarcated hemorrhages into and under the skin and the sudden terminal air hunger were doubtless due to other emboli.

FUSOSPIROCHETAL (VINCENT'S) INFECTION OF PLEURA AND VAGINA *

H. D. JUMP, M.D., AND S. J. SPERLING, M.D.
PHILADELPHIA

Reports of fusospirochetal infection of regions other than the mouth are appearing more frequently of late. Those of the respiratory system predominate. In view of the frequency of Vincent's infection of the mouth, its occurrence in lung pathology is exceedingly uncommon, Haden[1] stating that only 107 lung cases of all types had been reported up to 1927. He did not mention empyema as one of these types. We are reporting an interesting case of this rare condition associated with vaginal fusospirochetal infection.

E. R., a Negress, aged 35, entered the medical wards of the Philadelphia General Hospital, service of Dr. Jump, Oct. 14, 1930, complaining of pain in the chest. She stated that a sharp stabbing pain, made worse on deep breathing, had been felt in the left lower axillary and adjacent anterior chest wall one week before. She continued, nevertheless, with her household labors, the pain becoming less severe, until two days before admission, when she was so weak that she was forced to take to bed. There was no previous "cold," "sore throat," exposure to rain or draft, nor did she suffer from chill, cough, expectoration or hemoptysis. She vomited once before admission and complained of severe headache and vertigo. She had taken some "patent medicine" two days prior to admission, informing us later that "this caused an immediate vaginal discharge." Other than the presence of leukorrhea since her first marriage, fifteen years before, and the absence of pregnancies there were no symptoms referable to other systems. She weighed 135 pounds (61.2 Kg.) three months before.

Fig. 1.—Appearance of the chest before it was drained.

The patient had had measles in childhood and pertussis in 1922. She had not had any respiratory diseases other than a slight attack of influenza, during the epidemic of 1919, which did not confine her to bed. There was no history of syphilis or antisyphilitic treatment.

The family history was essentially irrelevant.

The patient was thin. She was acutely ill and toxic. The breathing was rapid (respirations 40 per minute) and shallow, without cough or expectoration. She presented the following positive features: slight temporal alopecia, slightly irregular but equal and reactive pupils, poor dentition with cavities, old root snags and pyorrhea, and slightly injected tonsillopharynx.

Examination of the chest showed marked dyspnea, diminished expansion of the left hemithorax, with marked tenderness of the left chest wall anteriorly. Over this area there were dulness, absent tactile fremitus, a suggestion of pectoriloquy with bronchial breath sounds, which became distant toward the base, and a few crackling râles at the apex. There were likewise a few fine crackling râles with impaired resonance at the right base posteriorly. The heart rate was 140, of normal rhythm with no murmurs. The apex beat was palpable 5 cm. to the left of the midsternum in the fifth interspace, while the right border was found 6 cm. beyond the right of the midsternum; the blood pressure was 155 systolic and 110 diastolic. The abdomen was slightly distended and vaguely tender in both iliac fossae. The liver edge was palpable at two fingerbreadths below the costal margin, in the mammillary line. As the patient was menstruating and was extremely toxic, no vaginal examination was performed. The impression was of lobar pneumonia with associated large effusion in the left pleural cavity, with a possible tuberculous background, pyorrhea alveolaris, syphilis and chronic pelvic inflammatory disease.

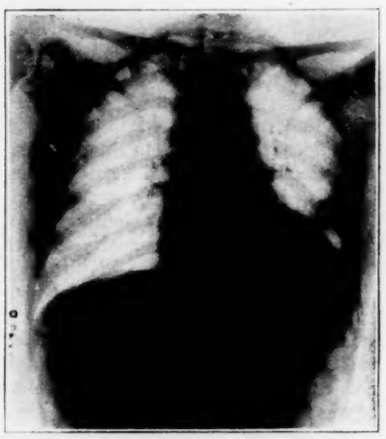


Fig. 2.—Appearance of the chest after imperfect (forceful) injection of iodized oil.

Laboratory examination revealed a heavy trace of albumin with a few granular and hyaline casts in the urine of specific gravity 1.024. The blood count showed hemoglobin 10.1 Gm., erythrocytes 2,810,000, and leukocytes 20,600, of which 90 per cent were polymorphonuclears and 4 per cent were lymphocytes. The sputum obtained from the nasopharynx was negative for tubercle bacillus but revealed many Vincent's spirilla and fusiform bacilli, which were thought to be due to the oral infection. The blood urea nitrogen was 13 mg., sugar 166 mg., and calcium 9.6 mg. The blood Wassermann (Kolmer) reaction was ++++, while the blood culture (aerobic) was sterile.

October 17, roentgen examination showed that there was a homogeneous density over practically the entire left hemithorax to the exclusion of the upper portion, which was hazy. The heart and trachea were displaced to the right. A diagnosis was made of empyema with probably associated pneumonia which might be tuberculous (fig. 1).

The patient became more toxic and irrational; she vomited but did not cough or expectorate. The temperature ranged from 100 to 102 and was not septic in character; the pulse ranged from 100 to 130, and respirations from 25 to 35 per minute.

October 21, the chest was tapped and 600 cc. of putrid, thick, greenish yellow liquid was removed, which grossly resembled pus due to colon bacilli. Vaginal examination at this time revealed a thick, foul purulent discharge with no specific cervical lesions, although examination was unsatisfactory. Vincent's spirilla and fusiform bacilli were reported present in the smears of the pleural fluid, vaginal secretion, throat and gingiva. In the pleural and vaginal fluids the spirilla dominated the picture, several cocci being present (hemolytic streptococci and streptococcus viridans as shown by culture). There were but few Vincent's organisms present in the oral smears, probably because of the frequent sodium perborate mouth gargles the patient had been receiving. A dark field study of the vaginal discharge and pleural fluid revealed many motile spirilla.

---

* From the Philadelphia General Hospital.

1. Haden, R. L.: Kansas City Southwest. Clin. Soc. Monthly Bull. 6:9-12 (Feb.) 1930.

October 23, Dr. John B. Flick resected the ninth rib posteriorly and drained two large pus pockets. Under daily irrigations of the empyema cavity with saturated sodium perborate solution, with frequent vaginal douching and mouth washes with this solution, and intravenous neoarsphenamine every five to seven days, she progressed very rapidly and satisfactorily, so that her temperature became normal in three weeks and continued so. The Vincent's organisms rapidly disappeared from the pleural exudate and vaginal discharge, the blood picture became more normal except for a secondary anemia, and the urine cleared up. During this entire period she was never troubled with cough or expectoration. One month after the operation, drainage had entirely ceased. Two months later she was returned to the medical ward with a drainage wound almost healed and not draining. Examination revealed slightly diminished resonance, and voice and breath sounds over the left hemithorax. The heart appeared in the normal position with the left border at 10 cm. and the right border at 3 cm. from the midsternal line. The blood pressure was 130 systolic and 90 diastolic. Neurologic examination was indicative of tabes dorsalis, but the patient refused to permit spinal puncture. Roentgenograms taken one and two months after admission did not indicate any underlying pathologic condition in the lungs. As we were not satisfied with the absence of clinical and roentgenographic evidence of underlying lung involvement, an attempt at injection by the bronchoscope of iodized oil was made. The patient struggled considerably so that the material was injected somewhat forcefully and the roentgenogram was not entirely satisfactory, but it pointed toward bronchiectasis of the left lower lobe (fig. 2).

The patient was discharged, December 23, in fairly good condition. The thoracotomy wound had entirely healed and the lung signs were those of thickened pleura over the left lower hemithorax, chiefly posteriorly.

COMMENT

Reports of fusospirochetal empyema are rare. Most of these cases have been secondary to some obvious underlying lung invasion, such as bronchiectasis, lung abscess and pulmonary gangrene, as in the group reported by Pilot and Davis.[2] The following are the only cases we could find in the literature that bore any resemblance to ours:

Lancereaux,[3] in 1919, reported a case of empyema with recovery, which occurred fourteen days after a wound of the chest and produced a hemothorax. In the purulent fluid numerous spirilla but no fusiform bacilli were found. He believed that these came from the injured lung.

Mason,[4] in 1920, recorded a case of pyopneumothorax in a boy, aged 16, in which many spirochetes which he believed were Spirochaeta bronchialis were found but no fusiform bacilli. This followed an attack of influenza five months before, with subsequent chronic productive cough (bronchiectasis), a violent attack of which he thought caused a pneumothorax with subsequent pleural infection. The boy recovered. Luger and Superina's[5] case was secondary to a diaphragmatic abscess and was associated with carcinoma of the stomach, peritoneum and liver, with pneumonitis. Leckie,[6] in 1923, reported a fatal case of empyema due to anaerobic gram-positive bacilli and cocci (Vincent's organisms are gram-negative facultative anaerobes), which followed the extraction of teeth for pyorrhea alveolaris one month previously.

In 1927, Bezançon[7] and his co-workers reported a case of putrid pleuritis in which many spirochetes associated with "la flore anaerobie de Veillon" were found. At necropsy "several very small cavities with a little pus" were found in the underlying lung. They comment on the rapid spirochetolysis that occurred, so that they failed to obtain the organisms in the pleural scrapings at necropsy. Jacquelin[8] and his associates, in 1929, reported a case of empyema caused by spirochetal anaerobic flora (numerous germs de la flore de Veillon) in which the suspicion of a bronchiectasis, aroused by abundant expectoration, was confirmed at necropsy, the organism being demonstrated likewise in the dilated bronchi. De Lavergne and Vigneul,[9] in 1927, reported fusospirochetes in a case of pleuritis but gave no history of the case.

The rarity of fusospirochetal pleural infection is matched by that of vaginal infection. Despite their presence about the external genitalia in normal people, Vincent's organisms are not found in leukorrheic cervical discharges, are uncommon in pathologic conditions of the external genitalia and are rare in the vagina.[10] Arnold,[11] in 1930, stated that his was the first case reported in the last thirty-five years. His patient had a cervical erosion, together with an ulcer in the vagina just above the fourchette, a Vincent's infection of the mouth and a leukopenia. The patient recovered. However, we have found other cases which occurred previous to his, reference to which will be made later.

McConnell,[12] in 1916, reported a case which presented a superficial cervical erosion with vaginal discharge containing Vincent's organisms. The mode of infection is suggested in McCormac's[13] patient in whom an ulcer developed on the labia minora (no vaginal lesions) several days after coitus with a man who had marked sore throat and who moistened his penis with saliva. Robinson's[14] patient had a Vincent's infection of the mouth, with ulceration of the vagina and the adjacent thigh, due to this organism. Pilot[15] reported a fusospirochetal vaginal discharge in a feebleminded girl, aged 9, in whom a hair pin was found in the vagina. A case of like character associated with foreign body was reported by Brown and Barlow[16] in a girl, aged 5. A lipstick holder and several polyps were found in the vagina. Roberts[17] recorded a case of Vincent's infection of the throat, vagina and cervix.

The mode of entry in fusospirochetal lung infection has been the subject of considerable investigation, chiefly as regards abscess. The frequent occurrence of the organisms in the mouths of supposedly normal people and in pyorrhea alveolaris (Pilot) has led the majority of observers to consider the respiratory passages as the portal of entrance. Likewise the absence of these non-spore forming anaerobic organisms in the blood stream (Larson and Barron's[18] report of the isolation of fusiform bacilli in the blood stream is questioned by Varney[19]) speaks against a hematogenous route. In addition, we have failed to find a record of any case of pleuritic involvement without underlying lung invasion. The mode of entry for vaginal infection seems obviously from the outside and in the cases reported is often associated with perversion practices. Our patient vehemently denied any such practices.

Our case presented several interesting features. In retrospect it seems most probable that there was a primary pleuritic infection with massive effusion, causing lung compression and giving signs of consolidation which, however, was never present. The history of onset, the lack of high fever and expectoration throughout the entire course, the absence of definite roentgenographic evidence of a basic pathologic condition in the lungs, and the rapid clinical improvement seem to us to speak in favor of this. Despite the presence of Vincent's oral infection we were at first inclined to view the pleural infection as having no underlying lung focus, but the observations made after the injection of iodized oil suggest a bronchiectasis, although the evidence is not conclusive.

From the few cases recorded in the literature the prognosis of fusospirochetal empyema does not appear very grave in cases in which no underlying massive lung infection exists. Open and early drainage, with applications of oxidizing agents, offers the most effectual results. Indeed, the rapid disappearance of

2. Pilot, Isadore; and Davis, D. J.: Studies in Fusiform Bacilli and Spirochetes, Arch. Int. Med. **34:** 313 (Sept.) 1924.
3. Lancereaux, E.: Presse méd. **27:** 556 (Oct. 1) 1919.
4. Mason: Bull. Johns Hopkins Hosp. **31:** 358, 1920.
5. Luger, A., and Superina, D.: Med. Klin. **17:** 1055 (Aug.) 1921.
6. Leckie, J. P.: Edinburgh M. J. **30:** 60 (Feb.) 1923.
7. Bezançon, F.; Jacquelin, A., and Célice, J.: Bull. et mém. Soc. méd. d. hôp. de Paris **57:** 1153 (July 14) 1927.
8. Jacquelin, A.; Brun, C., and Fourquet: Bull. et mém. Soc. méd. d. hôp. de Paris **53:** 1219 (Nov. 4) 1929.
9. de Lavergne, V., and Vigneul: Comp. rend. Soc. de biol. **97:** 383 (July 8) 1927.
10. Pilot, Isadore; and Kanter, A. E.: J. Infect. Dis. **32:** 204 (March) 1923.
11. Arnold, C. H.: Plaut-Vincent's Infection of Vagina, J. A. M. A. **94:** 1461 (May 10) 1930.
12. McConnell: New York M. J. **104:** 300 (Aug. 12) 1916.
13. McCormac: J. Urol. **13:** 565-568 (May) 1925.
14. Robinson, H. R.: Texas State J. Med. **22:** 687 (March) 1927.
15. Pilot, Isadore: Am. J. Obst. & Gynec. **18:** 824-826 (Dec.) 1929.
16. Brown, O. H., and Barlow, L. C.: Southwestern Med. **13:** 507 (Nov.) 1929.
17. Roberts, V. B.: J. Med. **10:** 125 (May) 1929.
18. Larson, W. P., and Barron, M.: J. Infect. Dis. **13:** 429, 1913.
19. Varney, P. L.: J. Bact. **13:** 275 (April) 1927.

the Vincent's organisms from the pleural sac even without treatment is the common observation.

SUMMARY

1. A case of fusospirochetal infection of the mouth, vagina and pleura without an obvious basic pathologic condition of the lungs is reported.

2. The rarity of Vincent's infection both of the pleura and of the vagina is discussed.

3. We have found no other case reported of the association of these two rare conditions or of a recovery from empyema in which both fusiform bacilli and spirochetes were found.

2019 Walnut Street.

Council on Physical Therapy

THE COUNCIL ON PHYSICAL THERAPY OF THE AMERICAN MEDICAL ASSOCIATION HAS AUTHORIZED PUBLICATION OF THE FOLLOWING ARTICLE.

H. A. CARTER, Secretary.

THE PRESENT STATUS OF LIGHT THERAPY

SCIENTIFIC AND PRACTICAL ASPECTS *

EDGAR MAYER, M.D.

SARANAC LAKE, N. Y.

Although there is much information concerning results of irradiating man and animals, explanations and indisputable generalizations are sadly lacking. When it is realized that even in photochemical reactions the physical process is not completely understood, the difficulty of explanation in biology and clinical medicine becomes more evident. No single explanatory hypothesis for the results ascribed to light action can yet be formulated, as there is great need of data obtained under definitely controlled conditions of dosage, intensity and wavelengths in normal and in abnormal organisms.

There is a lack of agreement between the practical and therapeutic results and the scientific and experimental observations. Experiments have been carried out for the most part on healthy men and animals, whereas usually the practical results have been obtained on the sick. The abnormal organism is much more sensitive. Diseased tissue may vary from normal in sensitiveness to radiation. The animal skin is not perhaps comparable to the same organ in man (as, for example, in exposing shaved guinea-pigs to sunlight, it is most difficult to produce erythema). In many reports the importance of sky radiation has been ignored, whereas it is possible that the beneficial effects of sunlight are in a great measure due to its luminous and infra-red portions.[1] It has been shown at Davos (Switzerland) that the radiation from the whole sky in summer has almost four times more ultraviolet shorter than the wavelength 366 millimicrons than direct sunlight,[2] and at Mount Wilson sky light was found to be several times richer in violet and ultraviolet than was direct sunlight.[3] Hence, although the intrinsic brightness of a small area of the sky is much lower than direct sunlight, since the solid angle subtended by the whole visible sky is 92,000 times that subtended by the sun, the integrated amount of ultraviolet from the whole sky is very appreciable.

The sun, with its accompanying factors of environment, can hardly be compared to artificial sources of light. The exact physiologic effects of light or of the air bath alone are not clearly understood, nor is the effect of light on single cells. In application, dosage has been difficult to control, and marked variation in the effects comes from a small stimulative or a larger destructive dose of light. Similarly, the technic of application with most workers has been different. Published experiments lack specific details in many instances, especially those pertaining to the spectrum, such as its limits and the distribution and the character of the radiant energy employed. These must be defined accurately instead of attributing results merely to "ultraviolet energy." Perhaps this is the cause of the contradictory nature of many of the results published.

Many claims made for the use of radiation are still based on empiric results, and practical applications have been made without scientific support, chiefly because the action of radiation on the living cell is not clearly understood and the fundamental principles of the biophysics and physiology of radiant energy are still unsolved. Perhaps when monochromatic sources of ultraviolet energy in sufficient intensity have become available to repeat experiments, more exact information will be obtained. To name two specific reactions of exact wavelengths, one may cite the ordinary erythema or sunburn production and the direct production of antirachitic effect. Aside from these, despite claims, the exact wavelengths alleged to increase hemoglobin, prevent or cure the common cold, and cure forms of extrapulmonary tuberculosis or even superficial ulcers have not been established.

So it is evident that confusion must still exist. Controversies constantly take place between the proponents of the use of sunlight and those of artificial sources. The value of sunlight for one form of disease against another, for instance pulmonary tuberculosis as against the extrapulmonary forms, is a subject for debate. The advantages of different artificial sources of energy are still open questions. The workers in high altitudes are still enthusiastic in expounding their clinical results in contrast to those in the lowlands. This difference of opinion appears in part due to the fact that, in the development of the use of light for disease, only empiric results were known for many years before accepted laboratory evidence was produced which placed light therapy on a scientific basis. The broad scope, therefore, of this whole field will allow me only brief reference to such fundamental facts.

SOME PHYSICAL PROPERTIES OF LIGHT

Workers vary in their divisions of the ultraviolet into the near or long ultraviolet and the far or short ultraviolet. Clinicians for convenience often term those ultraviolets longer than 290 millimicrons (the lower limit of sunlight) as the near or long ultraviolets; while those shorter than 290 millimicrons are then called the far or short ultraviolets. This is the designation used in this article. The boundary line for physicists is often taken at 200 millimicrons because above this wavelength it is possible to use ordinary photographic plates, quartz lenses and an apparatus open to the atmosphere. Below this limit, other means must be used. Some workers have even based the differentiation on transmission of the rays or the lack of transmission through window glass, the long or near ultraviolets penetrating window glass, the far or short being absorbed by it.

The spectrum of sunlight shows the visible region limited on one end by infra-red and on the other by ultraviolet rays (fig. 1). The visible spectrum extends

* To conserve space, the footnotes have been omitted here. They will be included in the reprint, which may be obtained at a cost of 15 cents, postpaid.

from about 760 to about 390 millimicrons. The lower limit of the visible region may vary with different individuals according to the sensitivity of the retina. The ultraviolet rays of sunlight extend from about 390 to 290 millimicrons, and those of clinically used artificial sources from about 390 to below 200 millimicrons. The ultraviolet rays of a source such as the plain carbon arc of 20 amperes, which has been so frequently used clinically, extend to about 220 millimicrons (the intensity can vary with amperage and with impregnations in the carbons), while those of the quartz mercury vapor arc terminate at 185 millimicrons.

All wavelengths of radiation appear to possess some ability to produce heat and to influence chemical reactions. As a rule, however, heat production is associated chiefly with the infra-red and the red rays. Light is associated with the rays from red to violet, while the wavelengths less than 240 millimicrons. The ultraviolet transparency of fluorite varies considerably from sample to sample, some specimens, from 2 to 3 mm. in thickness, transmitting as low as 80 per cent at 230 millimicrons. Ordinary window glass absorbs practically all ultraviolet radiations shorter than 320 millimicrons. Certain kinds of specially prepared glass transmit varying percentages of ultraviolet rays; clean vitaglass 2 mm. in thickness, for example, transmits 75 per cent of the ultraviolet rays at 320, 25 per cent at 290, and about 5 per cent at 270 millimicrons. At normal incidence about 9 per cent of the energy between 700 and 400 millimicrons is lost on account of the reflection of light at the surfaces of the glass, increasing to 20 per cent for an angle of incidence of 60 degrees.[6] Most window glasses which are made especially for transmitting short wavelength ultraviolet radiation

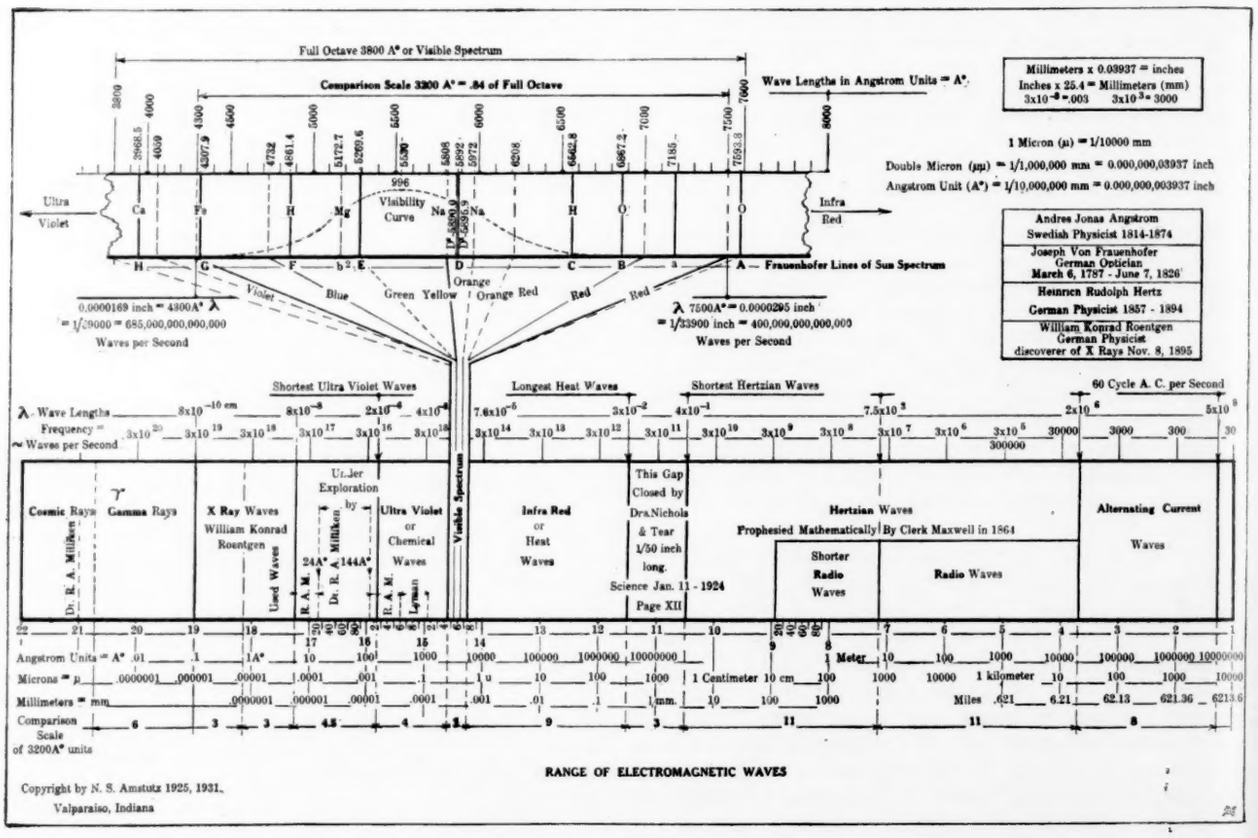

Full Octave 3800 A° or Visible Spectrum
Comparison Scale 3200 A° = .84 of Full Octave
Wave Lengths in Angstrom Units = A°.
Millimeters x 0.03937 = inches
Inches x 25.4 = Millimeters (mm)
1 Micron (μ) = 1/10000 mm
Double Micron (μμ) = 1/1,000,000 mm = 0.000,000,03937 inch
Angstrom Unit (A°) = 1/10,000,000 mm = 0.000,000,003937 inch
Ultra Violet
Infra Red
Visibility Curve
Andres Jonas Angstrom
Swedish Physicist 1814-1874
Joseph Von Frauenhofer
German Optician
March 6, 1787 - June 7, 1826
Heinrich Rudolph Hertz
German Physicist 1857 - 1894
William Konrad Roentgen
German Physicist
discoverer of X Rays Nov. 8, 1895
A — Fraunhofer Lines of Sun Spectrum
Violet
Blue
Green
Yellow
Orange
Orange Red
Red
Red
0.0000169 inch = 4300A° λ
= 1/59000 = 685,000,000,000,000
Waves per Second
λ 7500A° = 0.0000295 inch
= 1/33900 inch = 400,000,000,000,000
Waves per Second
Shortest Ultra Violet Waves
Longest Heat Waves
Shortest Hertzian Waves
60 Cycle A. C. per Second
λ Wave Length
Frequency = ~ Waves per Second
Cosmic Rays
Gamma Rays
X Ray Waves
William Konrad Roentgen
Ultra Violet or Chemical Waves
Visible Spectrum
Infra Red or Heat Waves
This Gap Closed by Drs. Nichola & Tear 1/50 inch long. Science Jan. 11 - 1924 Page XII
Hertzian Waves
Prophesied Mathematically By Clerk Maxwell in 1864
Shorter Radio Waves
Radio Waves
Alternating Current Waves
Angstrom Units = A°
Microns = μ
Millimeters = mm
Meter
1 Centimeter
1 kilometer
Miles
Comparison Scale of 3200A° units
RANGE OF ELECTROMAGNETIC WAVES
Copyright by N. S. Amstutz 1925, 1931, Valparaiso, Indiana

Fig. 1.—Range of electromagnetic rays.

most active rays chemically are the ultraviolet. The green region (500 millimicrons) is strongest in sunlight and best reflected by chlorophyll.

The infra-red rays longer than 1.4 microns are penetrating except for water, while the ultraviolet rays shorter than 0.3 micron are strongly absorbed.[4] The regions of the spectrum vary greatly in their degree of absorption in different substances.[5] Water and water vapor, for instance, absorb infra-red rays to a great extent except that region close to the visible from about 760 millimicrons to 1.4 microns. The ultraviolet rays lose the greater part of their intensity in penetrating the atmosphere to reach the lowlands.

Glasses.—Crystalline quartz and freshly distilled water that has not been in contact with glass are highly transparent to ultraviolet rays, in 1 cm. thickness transmitting about 80 per cent at 200 millimicrons. Quartz glass seems more opaque than crystalline quartz to season for the first few weeks of usage, losing a certain amount of transparency to ultraviolet. When this point is reached, the transmissibility is fixed and permanent, and they still transmit an effective quantity and quality of ultraviolet light for antirachitic effect. This has been shown for December in New York City with three hours' daily exposure in the middle of the day.[7] Corex-D glass (Corning, N. Y., Glass Works) transmits the solar ultraviolet rays more fully than other glasses except quartz, but its cost still makes its use prohibitive for any but research purposes.

Various thin and porous cloths treated with thin films of paraffin, and wire mesh screens filled with celluloidinous material transmit the solar ultraviolet and visible radiations very well, especially when these materials are freshly prepared. The ultraviolet rays between 320 and 290 millimicrons are probably the best pigment-producing rays; because of their absorption

by window glass, it becomes difficult to tan behind such glass. Sand, snow, ice and water increase the intensity of the ultraviolet by reflection; however, the dense humidity over bodies of water may intercept the reflected ultraviolet rays.

SOME BIOLOGIC EFFECTS OF LIGHT

Red and infra-red rays if of sufficient intensity produce an immediate hyperemia, which, however, soon disappears after the cessation of the irradiation. Infra-red rays longer than 1.4 microns, it has been shown, are more likely, through their superficial absorption, to produce cutaneous blisters in animals; those shorter than 1.4 microns penetrate the skin. The visible rays provoke vision, heat and metabolic changes;[8] the red rays are able to elevate subcutaneous temperature as much as 3 degrees C. without causing bodily fever. The infra-red and visible rays produce, through heating, a dilatation of superficial capillaries and an increased blood flow and exudation of lymph;[9] but, apart from their heating effect, the rays do not destroy cells except when cells which have been sensitized by such substances as eosin and hematoporphyrin are exposed to visible rays.[10] Their heat effects may aid the action of the ultraviolet rays on body cells.

The heating effect of visible and near infra-red rays must be mild on account of the small absorption in the epidermis and the strong convection by the blood stream. The heat produced by the far infra-red is slowly conducted to the deeper layers and up to the surface and carried away by the blood stream and air. Temporary heat erythema is not strictly local, in contrast to the delayed erythema of sunburn, which is limited sharply to the exposed area, due to local tissue changes of the nature of degeneration of the prickle cell layer resulting in capillary stasis, diapedesis of leukocytes and other signs of inflammation to the degree of blistering. Higher temperatures have produced increased oxygen consumption and greater local acidity of tissue, which can cause vascular dilatation.

Irritation of the skin gives rise to three responses; namely, local vasodilation, a wheal and finally, under severe action, a local edema and blistering. This triple response according to Lewis is provoked directly by a substance (H) similar to, if not identical with, histamine. The primary effect of irradiation in producing evidences of inflammation has been concluded by some to be an injury to the capillary endothelium; by others this is considered secondary to irritation by the toxic products of prickle cell degeneration.

Blister production that results from great increase of permeability may serve a protective function, since the fluid absorbs greatly in the region of 280 millimicrons.[11]

Ultraviolet rays are rapidly absorbed, in most part, by tissues of a depth of less than 1 mm., and produce marked chemical changes.

In penetrating through human skin, visible and near infra-red rays are strongly absorbed by the blood of the corium and subcutaneous layers. The local heating effect is rather mild on account of the small absorption in the epidermis and the strong convection by the blood stream. The far infra-red has little penetrating power, most of it being absorbed in the epidermis.[11a] The heat produced is slowly conducted away by the blood stream and by air. Overexposure of the germinal layer may lead directly to blistering. There is greater variation in percentage penetration of ultraviolet than in other parts of the spectrum. At 280 millimicrons the absorption in the corneal and prickle cell layers is marked so that the great antirachitic effect of this wavelength must occur in or about these layers; but on both sides of this band, around 300 millimicrons and 250 millimicrons, the penetration is greater, more radiation reaching the malpighian layer and corium, thus indicating that erythema production occurs in the germinal layer or the corium under the shadow of the upper layers. The corneal and granular layer, therefore, must play an important part in the light protection of these sensitive layers. From 250 millimicrons down the absorption in the corneal layer increases rapidly and at 200 millimicrons the absorption is so complete as to prevent any radiation from reaching the living layers of the skin.[12]

Grotthus' law states that a chemical reaction cannot occur unless suitable radiations are absorbed. Hemoglobin absorbs ultraviolet rays as well as many of those of longer wavelengths up to approximately 450 millimicrons. Blood serum absorbs the ultraviolet rays, possibly chiefly because of its tyrosine and tryptophan content. The ultraviolet rays necessary for the prevention and healing of rickets and the production of erythema are those below the region of about 320 to 313 millimicrons.[13] This region defines also the approximate upper limit of the bactericidal rays, although some

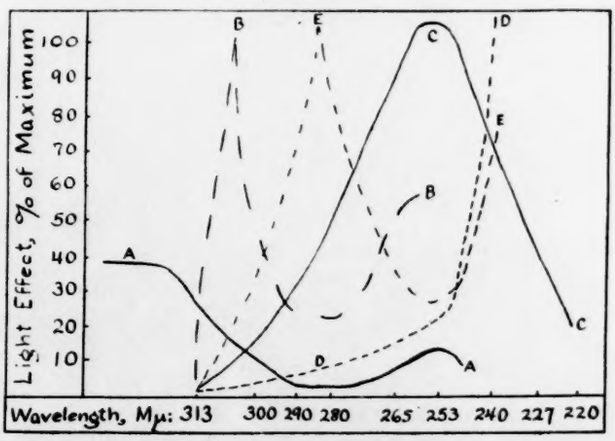


Fig. 2.—Light effect in percentage of maximum effect: *A*, curve of skin penetration; *B*, curve of erythema (Hausser and Vahle); *C*, curve of protein light reaction; *D*, curve of hemolysis; *E*, curve of killing of paramecia (Sonne).

experiments have shown bactericidal action with wavelengths at 365 millimicrons.[14] Ultraviolet rays of sunlight extend in their lowest limit to 290 millimicrons,[15] but lamps have some additional bands around 260 millimicrons that produce a fleeting erythema, as well as strong bactericidal rays at 265 millimicrons (fig. 2).

The brownian movement of protoplasmic colloidal particles ceases when exposure to ultraviolet rays coagulates the protoplasm.[16] Egg and serum globulin have been said to be formed from albumin under ultraviolet irradiation. Lens albumin previously sensitized by certain salts, such as calcium, sodium and magnesium, silicates or dextrose, becomes especially sensitive to ultraviolet radiation.[17] Most bacteria are destroyed by rays of certain wavelengths less than 313 millimicrons, the bactericidal effect being in proportion to selective absorption.[18]

Bactericidal Action.—Ultraviolet rays impair the growth of pathogenic and nonpathogenic bacteria as well as destroy them.[19] Young cultures have proved to be more sensitive to the rays than old ones. The resistance differs in bacterial individuals of the same culture and in various strains of homogeneous bacteria. The resistance also appears to be different in various

bacterial species. Bacteriophages display a notable sensitiveness to the rays, but ferments resist the rays better. Bacteria, in dry and pulverized garden earth, have survived exposure to ultraviolet radiation. Ultraviolet rays may destroy bacilli on the skin without causing injury to the latter, this depending much on the individual and local resistance to the rays. The bactericidal action of ultraviolet rays on organisms present in the air can be shown.[20]

The simple conclusion that the shorter the wavelength of ultraviolet the greater the bactericidal action is in error as it has been shown that there is a characteristic curve of bactericidal effectiveness for different bacteria, where the striking maximum is between 260 and 270 millimicrons.[18] The longer wavelength limit of direct bactericidal action on Staphylococcus aureus was found to be between 303 and 313 millimicrons. Bactericidal action has been observed at 225 millimicrons. Polarizing of light has no demonstrable effect on this action. Temperature elevation usually increases the action. The hydrogen ion concentration of the environment has no appreciable effect on the bactericidal reaction between limits of p_H 4.5 and 7.5.

Fig. 3.—Filling defect in cecum before treatment.

The use of monochromatic radiation in experiments on paramecia and on certain bacteria has shown that the bactericidal action is probably due to a destruction of the protein molecules within the cell as well as to a lipoid destruction of the surface membrane (fig. 2). Red blood cells in vitro are hemolyzed by ultraviolet energy, possibly because of increased permeability of the cellular membrane or of the destruction of the cell stroma or of both.[21] Despite the statements of previous workers that the susceptibility of protoplasm to ultraviolet light is conditioned by the absorption of the toxic rays by the aromatic amino-acid radicals of the proteins, still the close reciprocal correspondence between the curve of bactericidal action and the curve of absorption of ultraviolet by the nuclein derivatives (cystine, thymine and uracil) promotes the probability that a single reaction is involved in the lethal action of ultraviolet.

Protoplasm may be so affected by ultraviolet rays as to become especially sensitive to heat radiations.[22] The visible manifestations of tissue hyperemia due to ultraviolet radiation occur only after the lapse of a certain latent period, two hours or more. There probably takes place an absorption into the blood of products of tissue injury or an enhanced absorption of normal tissue products produced by such injury, with consequent erythema and edema. On repeated exposures, a pigment, melanin, is generally formed in the basal cells of the epidermis; this may be due to the action of certain skin oxidases on a breakdown product of tyrosine.[23]

Unicellular organisms are stimulated to certain physiologic changes such as fission, or they are destroyed by ultraviolet radiation, depending on such factors as the intensity of the irradiation, its penetrative power and the size of the organism. Thus, ultraviolet rays may reach the cell nucleus. Small doses of light appear to have a stimulating action, while large doses produce deferred physiologic changes, and still larger doses may destroy unicellular organisms. Amebas that are exposed to ultraviolet rays become strongly phagocyted by other nonirradiated amebas.[24]

Melanophores in the scales of fish develop an increased irritability with a small amount of ultraviolet radiation, while with larger doses they develop a decreased irritability and eventually die. The contractions are similar to those of smooth muscle. It has been shown that an increase in tonus of involuntary muscle has taken place after irradiation with ultraviolet; likewise skeletal muscle shows an increase on such irradiation, these results running parallel to those obtained with melanophores. The contraction of muscles under ultraviolet appears to be due to changes in the muscle cell and not to nerve stimulation.

Cholesterol, a substance found in comparatively large quantities in the skin, is activated chemically by ultraviolet irradiation. This has been shown by isolating cholesterol and rendering it antirachitic by irradiation with ultraviolet rays. It becomes endowed with antirachitic power in an unknown way through the action of the ultraviolet energy. It has been recently shown that pure cholesterol cannot be rendered antirachitic by the ultraviolet ray. The substance which is made antirachitic appears to be ergosterol, or an allied substance which is found in ordinary cholesterol as an impurity. Likewise, phytosterol of plants is so activated. Many food products, such as fats, oils, milk, vegetables and lettuce, may also become endowed with antirachitic power through exposure to sources of ultraviolet energy.[25] Ultraviolet irradiation of the pregnant mother renders her milk antirachitic.[26] How this takes place is still a matter of speculation; knowledge of the exact nature of radiation itself is so limited that its effects on tissues or food products becomes doubly difficult to understand. The greenness of many edible plants depends on several environmental factors, and sunlight in particular.[27] Vitamin A appears to be associated in some way with the greenness; that is, with the relative development of chlorophyll in the plant. Dry seeds and etiolated plants are as a rule poor sources of vitamin A. Mushrooms that thrive in darkness contain little of vitamin A.

FURTHER PHYSIOLOGIC EFFECTS OF LIGHT

The increase in calcium and phosphorus content of the blood serum in rickets and tetany under ultraviolet radiation is due in all probability to an increased absorption of calcium from the intestine.[28]

Antirachitic or calcium depositing agents, namely, vitamin D and ultraviolet rays of sunlight and of artificial sources, increase the free acid of the gastric contents, resulting in an increase in duodenal acidity. This aids in holding calcium salts in solution with the consequent increase in calcium absorption. Also, phosphorus absorption is increased since calcium is usually associated in the body with phosphorus in the form of phosphates. Sometimes phosphorus absorption may be the primary effect.

Under solar radiation, the blood shows increased alkalinity, a fact attributed more to the action of the heat rays.[24]

Radiation with massive exposures from carbon and mercury arcs has increased persistently red blood cells and reticulocytes,[29] but, contrary to expectation, there was no great influence exerted in hemoglobin regeneration in severe secondary anemia produced by continual bleeding of animals. Increase of hemoglobin in human anemias has been reported. However, this work does not yet convince us without much further support that such radiation is beneficial clinically in cases of anemia.

Reticulocytes vary in number with the season, being highest in the spring and lowest in the winter. This seasonal variation seems to be in direct proportion to the amount of sunshine. There may be a relation between the cure and the prevention of anemia, and sunlight or ultraviolet.[30] It is interesting to note that Macht found the serum of an individual suffering from pernicious anemia toxic to plant seedlings, this property being absent in specimens of blood from those with secondary anemia or other blood diseases. When the serum of a patient with pernicious anemia is irradiated with ultraviolet, it becomes much less toxic. These observations are in accord with those of some workers of a particularly favorable response of some patients with pernicious anemia to artificial sources of light.

Lymphocytosis in rabbits and possibly in man can be produced by exposure to the shorter ultraviolet rays.[31] Hematoporphyrin injected subcutaneously or applied locally to the mesentery of a frog or a mouse sensitizes the vessels to the visible rays, capillary stasis is produced, and thrombi of leukocytes are formed in the vessels at different points along the endothelial wall. Eosin (1:1,000) sensitizes the capillaries to the visible rays, so that stasis is produced by these rays alone. Cell membranes and capillaries develop increased permeability on exposure to ultraviolet rays. Animals kept in darkness from birth can show growth changes differing in no way from those exposed to light, but blood examinations have in some experiments shown lowered blood platelets.[32] On exposure of these animals to quartz mercury vapor arc radiations, the number of platelets has rapidly increased to normal. There is also evidence that the coagulation time is decreased.

Basal metabolism is increased only slightly, if at all, by light exposures alone, but it can be markedly increased by exposure to moving air. Some workers have reported even a drop in many cases. Increased heat output by radiation under a provoked hyperemia demands increased metabolism. Increased mineral metabolism is definitely provoked by light alone to give increased urinary output of nitrogen, phosphorus, sulphur and chlorides. Following exposure to light, respiration is decreased in rate but increased in depth. Increased body heat production obviously demands accelerated vital reactions. The rate of growth may be increased under the action of light.[33]

The improved physiologic action of the skin on exposure to light may be presumed; namely, as to increased secretory and protective powers. It may be speculated that the skin metabolism may be stimulated by light and the formation of glutathione may be increased. Perhaps the specific carbohydrate metabolism of the skin which has been demonstrated experimentally by the presence of lactic acid may likewise be stimulated.[34] This conception of the skin as an organ intimately concerned with complex chemical processes presents increased importance to the possibilities of light therapy. It has been related how intimately the skin is concerned with the elaboration of lipoid substances and how the epithelium is a structure that actively functions in the elaboration of keratin from keratohyalin, and so ultimate explanations may be had as to the effect of light in overcoming derangements from the normal in metabolism.

Fig. 4.—Absence of filling defect after treatment.

Acne vulgaris is less common in tanned skin than in untanned skin. During an epidemic of chickenpox at Rollier's clinic, cutaneous vesicles were not found on tanned skin, whereas they did appear on unexposed areas beneath plaster casts. Erythema of the skin produced either by heat or by actinic radiations is accompanied by transitory increased bacteriophagic and bacteriolytic power of the blood serum and leukocytes for streptococci, pneumococci and staphylococci.[35] Following exposures to solar radiations and to artificial

sources of light, especially with combined exposures to moving air, remarkable muscular tonus has been produced in unused muscles, despite prolonged application of immobilizing casts.

It is doubtful whether systemic effects resulting from local skin irradiation are due to reflexes arising from stimulation of nerve end-organs. No specialized receptors for ultraviolet rays have been differentiated. Also the vasomotor reactions result just as readily when denervated cutaneous areas are exposed to light.

It is still debatable whether changes are produced in the blood directly by penetrating rays. If so the visible and near ultraviolet are responsible for systemic effects due to blood changes.

It seems possible that hormones are produced in the skin because a systemic effect, like the antirachitic, results from irradiation with rays of which only approximately 10 per cent penetrate to the blood vessels.[11]

The action of light on the body is in all probability largely an indirect one by way of the cutaneous cells, nerves and blood vessels. Ultraviolet rays for the most part are absorbed by the epidermis. Deeper penetration of the longer visible rays and of the shorter infra-red rays may allow of some slight direct action, but there is little cause to believe that this can be of much direct therapeutic value. Therefore, penetration should not be stressed as the factor for the interpretation of physiologic effects.

Heat rays and heat effects of luminous rays have been shown to increase and hasten the effect of ultraviolet energy, but also experiments[36] have shown that red rays may act antagonistically to ultraviolet. Thus cholesterol has become activated by ultraviolet rays so as to contain the antirachitic vitamin; thereupon, a successive exposure to red rays caused a loss of antirachitic property. Likewise, old ineffective ergot preparations could be reactivated on exposure to ultraviolet, but subsequent irradiation with red rays again destroyed the efficacy. On the other hand, the estrus hormone could be destroyed by ultraviolet but reactivated by red rays.

In short, a summation of the mode of action of light in the present state of our knowledge is difficult. The isolated experiments carried out on single cells, on bacteria, on the components of cellular structure, and so on, are difficult to carry over and apply to the effects on the human body. Certain rays do penetrate directly to the capillaries but their effects can only be assumed through such action. Vitamin D-like substances are definitely formed but their effects on the body except in disturbances of calcium metabolism are undefined. Increased cell permeability as a result of light exposure can be demonstrated, which may imply improved cellular nutrition. Exact effects on the other components of the skin and on the various skin functions, or directly on the blood circulation and so on the body functions, must still remain for future investigation to define accurately.

LIGHT AND MOVING AIR FROM OUTDOORS

The application of light necessarily requires consideration of accompanying moving and open air. With lamps, moving air from outdoors should be employed, if possible. Air movement produces increased heat radiation and conduction with better respiration and excretory function of the skin. Cool moving air acts directly on the vasomotor system, stimulating the superficial capillaries, producing a hyperemia and, in turn, a depletion of the cutaneous circulation. This, acting as a massage, may be responsible for the development of muscle, otherwise immobilized in treatment. With sunlight therapy, the effect of moving open air is greater, but air exposures may well be utilized with artificial light therapy through satisfactory ventilation of the treatment room. Carbon arc lamps may be effectively used outdoors in cloudy warm weather. However, chilling should always be avoided even at the expense of losing the air movement when one is employing artificial sources of light.

SUNLIGHT VERSUS CARBON ARC AND QUARTZ MERCURY VAPOR ARC LAMP

In midlatitude, sea level stations, during midsummer, clear midday sunlight contains intense ultraviolet rays down to 297 millimicrons. Those around 290 millimicrons, its lowest limit, are in intensity about one millionth of those around 310 millimicrons. Its emission of visible and infra-red energy is very high.

Proponents of solar therapy have insisted on the use of radiation having a spectrum with components relatively like those of sunlight. The clinical results with solar exposures have been most favorable in the hands of these workers. Sunlight possesses an advantage in the favorable psychic reaction which makes the patients much more willing to submit to prolonged periods of exposure. Yet there is empiric evidence and theoretical basis for expecting very favorable therapeutic results with other combinations of light rays.[37] Aside from the calcium-deficiency diseases such as rickets and tetany, the favorable clinical results with radiation cannot be ascribed only to the vital ultraviolet region. In fact, even in bone and joint tuberculosis there is now impressive evidence indicating the importance of the visible radiation and the wavelength region lying between 320 and 390 millimicrons.[38]

Quartz Mercury Vapor Arc Light.—About 0.1 per cent of the total output of the energy of sunlight is in the short wavelength ultraviolet rays, the variation dependent on the geographic location, season of year, time of day and kind of weather; but the total output of the solar "near ultraviolet" is large when one considers the total intensity of sunlight.[39] As against the mercury arc, it lacks the short ultraviolet rays below 290 millimicrons. The quartz mercury vapor arc lamp emits a marked preponderance of ultraviolet energy in relation to its total output. It emits relatively much less visible and infra-red energy than does sunlight; most of the infra-red comes from the heated quartz, the electrodes, the supports and the reflecting hood.[40] About 17 per cent of its ultraviolet rays (the total ultraviolet being considered 100 per cent) are of shorter wavelengths than the lower limit of sunlight. The lower limit of its radiation is 185 millimicrons, but in therapy it is rarely below 200 millimicrons. Its upper limit of radiation is about 12 microns in the infra-red. The radiation less than 450 millimicrons represents two thirds of all radiation below 1.4 microns. It consists of a weak continuous spectrum down to 250 millimicrons and a number of spectral lines of high intensity from 450 to 185 millimicrons. Quartz allows the transmission of the rays from 185 to 320 millimicrons which are not transmitted by window glass. The intensity increases rapidly in the first few minutes to reach the final value in about ten minutes after the arc has been started. For local treatment a water cooled quartz mercury vapor arc light is frequently employed either with or without quartz compression lens or other quartz applicators, varying with indications.

Carbon Arc.—The spectral components emitted by the carbon arc are similar to sunlight, except for an additional band at 3,883 angstrom units, but vary in intensity. The total radiation emission and the relative intensity of some of its spectral components may be altered by varying the voltage and amperage, by altering the diameter of the carbons, and by impregnating the carbons with suitable metals or salts.[41] The plain carbon arc of low amperage (from 3 to 10 amperes) has rarely proved of clinical value in local applications; those of higher amperage (20 or more amperes), especially those burning impregnated carbons, have been reported effective in general body exposures. The high intensity arc has an output of total energy closest to sunlight. Nickel, iron, titanium, aluminum and tungsten are all employed for impregnating the carbons.[42] Groups of (from 20 to 30 amperes) carbon arc lamps are often used for irradiation of several bedridden or ambulant patients; high amperage lamps (from 50 to 125 amperes) are, as a rule, used chiefly for groups of patients. There are those utilizing 90 amperes that can irradiate twelve or more patients at a time. The cost of installation, the operation charges of large carbon arcs and the care necessary make them useful chiefly for the handling of groups of subjects in institutions.

Of the ultraviolet rays, the plain carbon arc emits chiefly the longer (near 400 millimicrons); that below 300 millimicrons is comparatively weak. Carbons with special impregnations or cores now employed in carbon arc lamps emit additional radiation characteristic of the metal or chemical employed within the carbon. Carbons impregnated with iron, tungsten, titanium and nickel emit rich ultraviolet zones down to about 220 millimicrons; in addition, carbon arc sources emit much infra-red and red radiation. With great energy input, carbon arcs can emit a large quantity of radiation. For best efficiency, a definite relationship must exist between the diameter of the carbons and the amperage employed.

The greater the amperage, the more heat is generated. A lower amperage arc can be operated nearer to the patient because its lessened heat makes this tolerable. Hence, by the law of inverse squares, close exposures increase the quantity of light utilized. As a result, lesser amperage arcs, such as 29 amperes, with specially impregnated carbons, may prove as effective on close irradiation of single patients as high amperage arcs necessarily operated at greater distance and generally employed for groups.

Other artificial sources of light are frequently employed, especially in the European clinics. These include arcs between electrodes of tungsten, iron, magnetite or cadmium; also oxyacetylene flames. A recent development is a combination of a mercury arc between highly incandescent electrodes of tungsten, all enclosed in a special glass (Corex) that absorbs the ultraviolet shorter than 280 millimicrons, not present in sunlight.[43] The total intensity at about 3 feet distance is about one-twelfth average solar radiation. About 1.5 per cent of the total radiation emitted consists of radiation of wavelengths less than 313 millimicrons.

A so-called cold quartz light, also recently developed, is a glow discharge through mercury vapor, emitting mostly short ultraviolet rays shorter than those present in sunlight (90 per cent or more at 254 millimicrons). The exact place of these sources of light in therapeutics must still be fixed.

Indications for the use of various sources of light therapy are still inexact, as are also the contraindications; but in many localities in cold and cloudy seasons of the year, when sunlight is too uncertain and solar exposures are too interrupted, artificial sources of light have proved valuable aids and substitutes.

PIGMENT

Mercury vapor arcs produce a yellowish-brown pigmentation. However, at times I have observed mercury vapor lights produce a pigment barely distinguishable from that produced by sunlight, but it does not last as long. Pigment produced by intense sources of heat, such as oxyacetylene blasts or osram lights, is said to simulate sunlight tan closely, and to be just as permanent (Kisch). This is doubtful. The pigment from sunlight, the carbon arc and tungsten arc is blackish brown or red-brown.

That increased pigment production necessarily means an increased tendency to healing is not generally accepted. Similarly, however, the maintained production of an erythema is not a necessary accompaniment of improvement. Pigment can protect against an overdose of ultraviolet energy; it absorbs light, changing it to heat, and may allow for better heat radiation; it is doubtful whether it sensitizes the skin to visible light as chlorophyll does the plant. Patients who failed to develop pigment have responded favorably to treatment,[44] just as patients who developed a strong pigment often failed to heal. The development of ultraviolet pigmentation is independent of that of tolerance, and ultraviolet tolerance is possible without pigmentation. A suspension of melanin has been shown to protect the frog's mesentery from ultraviolet rays.

Primary melanin deposit is in the basal cells of the malpighian layer; and the greatest absorption in this layer, according to Bachem and Reed, occurs at 300 and at 250 millimicrons. Therefore, pigment production must be due mainly to these spectral regions; and it appears to be the expression of a local response to the irritation of the prickle cells, which lie immediately above the basal cells where the pigment is deposited. In addition to the irritation, a mother substance (dioxyphenylalanine or tyrosine or some closely related compound) and an enzyme (an intracellular oxidase called dopa-oxidase) are necessary.

Pigment undoubtedly is in some way correlated with increased tolerance to irradiation. It not only absorbs but radiates energy. It increases absorption to the yellow and green and so suggests an adaptation to sunlight (which has its greatest intensity in this region). It may sensitize tissues to long rays and so shift the effective threshold toward the red region; but there is no evidence of its changing short lethal rays to long nonlethal ones, as Rollier has suggested.

Of the rays that produce pigment readily, a fairly large percentage has been found to penetrate beyond the pigment-bearing cells. Pigment cells lying beneath prickle cells cannot account for the increased tolerance of the latter to subsequent irradiation, unless melanin may cause systemic effects that allow for this. Chemical change produced in the corneal layer may also be a factor.[11]

DOSAGE

Curative results in light therapy may be brought about without the production of marked cutaneous burn, and even the first degree of redness need not be produced. In treatment of rickets, exposures with the quartz mercury arc as small as five minutes anteriorly and posteriorly twice weekly have proved curative. The skin offers a vast field of living cells, which are exposed to stimulation or injury in many ways, and such an effect

may provoke immunizing or harmful effects. Certain regions of ultraviolet between 313 and 250 millimicrons produce skin erythema; about 69 per cent of the light erythema is caused by rays from 302 to 297 millimicrons. Four per cent of this maximum is at 313 millimicrons; 45 per cent is around 253 millimicrons. Erythema is not caused by even one hour's exposure of the skin to ultraviolet rays longer than 330 millimicrons (Hill). Rays shorter than 250 millimicrons produce a very faint erythema. Dosage in therapy with unfiltered lamps must therefore be regulated by the intensity of wavelengths from 313 to 250 millimicrons present. Erythema varies with the intensity of the wavelengths of those regions and the duration of exposure to the source of ultraviolet rays, the distance from the source, the temperature, and the individual sensitiveness of the skin.

The dosage of light to be used therapeutically cannot be fixed, and it will vary with the disease treated. The sources of light and the individuals irradiated vary too greatly to allow of any generalization. Even different areas of the body vary greatly in their sensitiveness to radiation. Some workers prefer an erythema, others a suberythema dose; still others strongly stress the desirability of the production of pigment. The Copenhagen school, employing particularly the carbon arc light, prefers erythema.

A practical method is to aim at a faint erythema production with each dose applied. Thus, skin sensitiveness is maintained. (This dose of light has produced in the hands of some workers an increased bactericidal power of the blood, whereas excessive dosage has produced a marked decrease and in animal experimentation has appeared to hasten death). Overheating of the body is avoided by using short and intense exposures. The degree of skin erythema may guide in regulating dosage. Exfoliating skin is very opaque to ultraviolet rays, while newly exposed skin is very sensitive. The skin is rested during desquamation and several days elapse before further exposure to this area. When the skin becomes insensitive, say to large doses of mercury vapor quartz light, an exposure to long flame carbon arcs is employed. When pigment is established by this source, so that a long exposure is now required to produce redness, this exposure can be reduced by using nickel-cored or tungsten-cored carbons. The method requires only fifteen minutes' maximum radiation in contrast to the Finsen method, with which a two hour exposure is the rule.[45] Skin colorimeters have been made aiming to measure varying degrees of erythema; but their accuracy is questioned. Rollier and his followers, on the other hand, aim for pigment production.

Overdosage of light may produce injury, although nature has left a wide margin of safety. Excessive exposure has caused a drop in the bactericidal power of the blood with malaise and fatigue. During menstruation, the blood bactericidal power was lowered and irradiation appeared to make this even worse.[35] In experiments in which rabbits were given a septicemia, the bactericidal power of the blood fell to a very low degree and was not improved by irradiation, thus supporting the view generally held that in the treatment of acute infections by light one should be very cautious. Very aged patients have been considered to have their resistance to infection lowered by the injudicious application of light.[46] In tuberculosis, overdosage has produced focal reactions that have done harm; light may set up a focal reaction similar to that of tuberculin. In anemic rats, careful irradiation has led to a rapid regeneration of erythrocytes and hemoglobin; but if the irradiation was too vigorous, blood cells were destroyed.[47] Overexposure to ultraviolet has rendered ergosterol inactive against rickets. On the other hand, prolonged and intense irradiation of rats with ultraviolet (over a period of six months) had no unfavorable effect on the rate of growth or on the size or appearance of the endocrine glands.

In some cutaneous disorders (eczema, psoriasis, lupus erythematosus, herpes simplex, erythema solare perstans, xeroderma pigmentosum, freckles, atrophy, keratoses, prematurely senile skin) exposure to such rays may cause an exacerbation, provoke an attack, or produce other injurious effects.

The schedule for increasing the period of exposures with various sources of light must vary. The physician is to be guided chiefly by the signs and symptoms evinced by the patients in their response to treatment, in addition to the skin reactions. Furthermore, in disease such as tuberculosis, the selection of a form of light therapy may depend on the state of activity or on the type of disease to be treated; thus, with a febrile advanced case, one would usually prefer to avoid using heat rays. One may also have to depend on the source of light available or be influenced by the season of the year. Furthermore, a failure in response to one form of light therapy may be an indication for the trial of another form, or possibly many forms of light therapy may have to be combined in various ways. I have found that some patients with sallow complexion showed little skin erythema on the first exposure to the mercury vapor quartz lamp, but if previously treated with from three to four doses of the carbon arc lamp they later reacted with erythema. There may exist contraindications to light therapy which are not yet clearly understood but which later with more experience may become evident.

It is highly probable that, in most forms of progressive acute tuberculosis, light therapy is not indicated. It is well known that roentgen therapy is not indicated in such cases. In my experience, intestinal tuberculosis is an exception. In this complication at times, even when progressively active, mercury vapor quartz light has seemingly been of great value.

With any form of tuberculosis, light is used merely as an adjuvant and should be combined with every other possible aid. The mainstays of treatment still exist in rest, good food and hygienic outdoor life.

With bone and joint tuberculosis, orthopedic treatment with immobilization and traction is absolutely essential while light exposure is being employed. Surgical intervention is occasionally needed, especially for the aspiration of abscesses or for hastening the expulsion of sequestrums. Joint resection and surgical fusion are necessary less often with heliotherapy, but there may even yet be certain social, economic and other factors, as well as the stage of the disease, that occasionally force this intervention. The plaster cast is less often needed. As pointed out earlier, one always combines general and local light exposures, regardless of the location of the lesion.

TECHNIC OF EXPOSURES

With sunlight, the patients are graduated to increasing periods of exposures over increasingly large areas of the body according to Rollier's technic. Sunlight of the lowlands and highlands can both be employed clini-

cally, but the heat of the day should be avoided.[48] Diffuse daylight and air exposures on cloudy days are used to great advantage. Chilling winds should be avoided. Overexposures may incite latent foci of disease to activity. It is important that patients during and after solar exposures feel as well as or better than they do before taking them. Headaches, restlessness, nervousness or irritability, elevation of body temperature or pulse rate are all indications of undue reactions that call for some change in the program of solar exposures.

With plain carbon arcs, as used at the Finsen Institute, one begins with a fifteen minute irradiation, front and back, and then increases daily fifteen minutes front and back until exposures of two hours daily are reached. The lamps are placed at a distance from the patient, so that the heat emitted from this source of light is tolerable. Frequently, sweating occurs during the exposures. The treatment is then terminated with a sponge bath. General body exposures are always employed, and, if possible, an additional local exposure is made. In these cases as much skin surface as possible is irradiated. With impregnated carbons, depending on the cores and the amperage employed, one can gage the dosage by watching for skin erythema and the general constitutional reactions. With these one must feel one's way cautiously by first using very small exposures. With a 90 ampere carbon arc, beginning exposures of one-half minute are made, at a distance fixed for various makes of apparatus—usually above 6 feet—and perhaps twenty minutes secures the maximum exposure. Although with the Finsen arcs of thick carbons, exposures of two hours are made, fifteen minutes is the longest time with the long flame arcs. The aim has been to determine the optimal amount of skin to be exposed. Thus, a method of exposure of only limited skin areas such as the thorax or back, with a new area every other day so as to utilize four parts and return to the area of the first exposure on the tenth day, has given very favorable results. The skin is thus maintained in a light-sensitive state, and no exposure is given during desquamation. The question of the advisability of such a manner of irradiation is not yet solved.

With a new mercury vapor quartz light, alternating current of 5 amperes, 110 volts, I have also made exposures purely on an empiric basis, beginning with one minute at a distance of 36 inches from the body, employing two exposures in front and two behind, and centering over the middle of the upper and lower halves of the body in order to expose uniformly as much of the skin surface as possible; a fifth exposure is then made directly over the area of disease to include any possible reflex depth action; a daily increase of one minute is added to the exposure until a ten or rarely twenty-minute period is reached front and back at this distance on all five parts. The room temperature is maintained at about 70 F. Ventilation is employed, so that the patient senses the movement of air. Heat lights (carbon incandescent bulbs) are added, if the patient is not able to endure the ventilation without discomfort. With older burners, dosage is increased more rapidly.

The quartz burner is then slowly brought nearer to the body by lowering it about 1 inch every other day until it is 18 inches from the skin if no redness of the skin occurs with the previous dose. After this, the second intensity is frequently employed, especially if the burner is one that has had considerable usage. In addition to the general body exposures with the air-cooled mercury vapor light, a contact exposure is often made to a superficial focus of disease by means of an applicator attached to the water-cooled mercury vapor light.

More recently I have been decreasing the dose, exposing only every other day, and on less skin area, aiming rather for suberythema dosage. The results are apparently as favorable as with the procedure already outlined.

CLINICAL RESULTS

It has been scientifically proved that a certain region of ultraviolet radiation produces a vitamin D-like substance, and it therefore favorably affects calcium metabolism in calcium-deficient disease.[49] Thus, clinically, ultraviolet is most effective in rickets, tetany and osteomalacia. Its value in overcoming a demineralization of the pregnant and nursing mother presents favorable substantial evidence.[50] The empiric results are strongly impressive when light is used as an aid in certain skin diseases, superficial ulcerations and many forms of extrapulmonary tuberculosis. Serious workers will deplore the extravagant claims which have from time to time been made for the therapeutic effectiveness of ultraviolet radiation covering so many diseases that it is impossible to enumerate the entire list. It must be left to the future to substantiate and disprove reported favorable clinical results in conditions such as secondary and pernicious anemias, nasal sinusitis, hay fever, common colds, catarrh, asthma or carbon monoxide poisoning, and many skin diseases. Light has repeatedly been quoted as an important tonic agent and one that will raise resistance against most systemic infections, without proof of action. Colored glasses placed over lamps have also frequently been so advocated.

In skin diseases, ultraviolet has proved truly of great value when used locally and generally in the treatment of lupus vulgaris and scrofuloderma. It has occasionally been found useful in acne vulgaris, psoriasis, indolent ulcers, pityriasis rosea (in erythema doses) adenoma sebaceum (in blistering doses) and erythema induratum. It has been of questionable value in the treatment of boils and generalized staphylococcus infections of the skin, and alopecia. It has generally not fulfilled the promise of earlier reports in the treatment of lupus erythematosus.

In tuberculosis, light of any form by itself is not curative but comprises only one of the important adjuvants in treatment. To believe that sunlight or lamps will cure all forms of extrapulmonary tuberculosis, to be unduly optimistic about this treatment and consider it specific, to use it without sound medical guidance and adequate equipment, and to use it to the exclusion of rest and the hygienic-dietetic regimen in the open, eliminating orthopedic measures or the occasional necessary surgical intervention, will bring discredit to a really desirable form of treatment.

If one employs light as an aid only, the most favorable response to solar exposures has been shown in the so-called pretuberculosis of children, and tuberculosis of the lymph nodes (including hilus), pleura, bones and joints, peritoneum and intestine.

Less favorable results (yet often good) are obtained in genito-urinary, laryngeal, ocular, aural and cutaneous tuberculosis. Pulmonary tuberculosis I do not consider an indication for light therapy. With joint tuberculosis, Rollier claims the fibrous form of ankylosis has been

overcome and joint function has been restored, but how permanent these favorable results will prove to be cannot be stated. Restoration of function may occur in the synovial form of joint tuberculosis even after large effusions have been absorbed; but one is still entitled to doubt a functional return of motion in a joint when the bony parts have been destroyed to any degree. Orthopedic measures still play the major rôle in bone and joint tuberculosis; and intervention by surgical fusion should always be considered in cases of advanced bony destruction. With lymph node disease, massive tuberculous glands have been extruded from their capsules during healing by light. Fistulas are most resistant to treatment.

With plain or cored carbon arcs of high amperage (from 55 to 75 amperes) or with arcs of lower amperage (from 20 to 29 amperes), the best results have been reported with cutaneous and ocular (corneal and phlyctenular) tuberculosis and that of the bones and joints, lymph nodes, larynx, peritoneum and intestines; less favorable have been the reports on pulmonary and genito-urinary tuberculosis.

In my own experience with the use of the quartz mercury vapor light as an adjuvant, the most favorable response has been encountered in intestinal tuberculosis. The diagnosis is established by a history of all varied digestive complaints, such as alternating constipation and diarrhea, nausea, vomiting, abdominal pain, soft or watery stools, or merely by persistent loss of weight or slight elevation of temperature otherwise unexplained—by any or all of these symptoms combined with roentgen demonstration of spasm or filling defect in the cecum or ascending colon in a patient known to have pulmonary tuberculosis. Figures 3 and 4 show roentgenographically the intestine with a filling defect before treatment, and an almost complete disappearance of this defect after eight months of quartz mercury vapor exposures; this improvement was accompanied by a cessation of the digestive complaints. After the study of a large series of such cases, of which the foregoing is typical, I am convinced that this recovery is directly related to the light therapy and occurs frequently if the disease is not of the acute progressive type and if the patient's condition is not too poor. However, these are only clinical impressions, and experimental proof is yet needed.

Other forms of tuberculosis which in my experience are frequently helped by mercury arc light exposures (when light is used only as an aid) are the "hilus glandular," or so-called hidden tuberculosis of children and adults, and the superficial forms of tuberculosis, such as the cutaneous, oral or pharyngeal, laryngeal (except the acute and the edematous forms), corneal and phlyctenular ocular tuberculosis, and the lymph node and peritoneal tuberculosis. Less favorable in their response but yet often improved are genito-urinary, and bone and joint tuberculosis. Postoperative sinuses after nephrectomy are especially responsive.

Reliance on any source of light as an important aid in pulmonary tuberculosis is not to be encouraged.

From the foregoing presentation of the present status of light therapy it is evident that harm may be done by the injudicious and uninformed use of light. Valuable as this method has proved itself to be in a limited number of diseases, it is surely clear that much more investigation and many more scientific data are required before light should be generally prescribed by those unfamiliar with the contraindications and the details of its application.

Council on Pharmacy and Chemistry

NEW AND NONOFFICIAL REMEDIES

THE FOLLOWING ADDITIONAL ARTICLES HAVE BEEN ACCEPTED AS CONFORMING TO THE RULES OF THE COUNCIL ON PHARMACY AND CHEMISTRY OF THE AMERICAN MEDICAL ASSOCIATION FOR ADMISSION TO NEW AND NONOFFICIAL REMEDIES. A COPY OF THE RULES ON WHICH THE COUNCIL BASES ITS ACTION WILL BE SENT ON APPLICATION.

W. A. PUCKNER, Secretary.

SOLUTION BRAIN EXTRACT (See New and Nonofficial Remedies, 1931, p. 188).

Thromboplastin Local-Squibb.—An extract of cattle brain in physiological solution of sodium chloride, prepared according to the method of Hess.

Actions and Uses.—See Fibrin Ferments and Thromboplastic Substances, New and Nonofficial Remedies, 1931, p. 186.

Dosage.—See Solution Brain Extract, New and Nonofficial Remedies, 1931, p. 188.

Manufactured by E. R. Squibb & Sons, New York. No U. S. patent or trademark.

Thromboplastin Local-Squibb, 20 cc. vial.

Blood plasma is obtained by bleeding 45 cc. of sheep's blood into a tube containing 5 cc. of 1 per cent sodium oxalate in physiological solution of sodium chloride, centrifuging the mixture to obtain the clear plasma and preserving this at a low temperature. A 0.5 per cent calcium chloride solution is prepared by dissolving 0.5 Gm. anhydrous calcium chloride in 100 cc. of physiological solution of sodium chloride. Place 5 drops of blood plasma in a flat bottomed vial, add 3 drops of calcium chloride solution and 2 drops of the thromboplastin local-Squibb to be tested and mix the contents by gentle rotation: no more than sixty seconds should elapse before the vial may be completely inverted without loss of its contents.

PRELIMINARY REPORT OF THE COUNCIL

THE COUNCIL HAS AUTHORIZED PUBLICATION OF THE FOLLOWING PRELIMINARY REPORT.

W. A. PUCKNER, Secretary.

CARBARSONE

Carbarsone, according to the reports of Dr. C. D. Leake and his collaborators, who have been conducting preliminary trials of the amebacidal value of the product, is *p*-carbamino-phenyl arsonic acid. The firm of Eli Lilly & Co. has collaborated with Dr. Leake in the production of the product and has agreed to undertake its manufacture. The Council considers "Carbarsone" a suitable nonproprietary name for *p*-carbamino-phenyl arsonic acid; Eli Lilly & Co. and Dr. Leake have agreed not to claim proprietary rights over the name. If further clinical evidence demonstrates the eligibility of the product for inclusion in New and Nonofficial Remedies, it will be included in the book under that name.

Two papers by Leake and his collaborators, submitted for publication in THE JOURNAL A. M. A. and printed in this issue (pp. 189 and 195), give an account of the pharmacologic and clinical work done with the product:

A. Chemotherapy of Amebiasis, by C. D. Leake: The author reviews the drugs used for amebiasis and finds none wholly successful. He reports animal and clinical (thirty-three cases) use of Carbarsone. It was found ineffective in monkey amebiasis so far as clearing the stools of cysts of Endamoeba histolytica is concerned, but the investigator was encouraged by general improvement of the animals under treatment with repeated small doses of the drug. In thirty of the thirty-three human beings who were given adequate stool examinations at daily intervals for a three months follow up after cessation of treatment the author reports that the stools have been consistently free of E. histolytica with relief from symptoms and general improvement in physical condition and without untoward effect.

B. Carbarsone in the Treatment of Amebiasis, by A. C. Reed, H. H. Anderson, N. A. David and C. D. Leake: The authors found lack of toxic effect on animals following continued administration of Carbarsone within the therapeutic range. They report clinical use of the product in forty cases (no statement is made as to whether the thirty-three reported in the paper by Leake are included, but comparison indicates that they probably were). These cases are reported as all freed of

E. histolytica during treatment, and thirty-six remained so for an average post-treatment observation period of four and one-half months (three did not cooperate). The average total dose given was 75 mg. per kilogram over a ten day period, representing 0.25 Gm. daily for ten days in gelatin capsules by mouth. The authors conclude that further extensive clinical trial is desirable.

Dr. Leake and his collaborators have submitted the manuscript of a report, "Comparative Toxicity and Protozoacidal Action of Acetarsone, Carbarsone and Certain Pentavalent Arsenical Compounds," presented before the Pacific Coast Section of the Society of Experimental Biology and Medicine, and Eli Lilly & Co. has made a formal presentation of the product for consideration of the Council.

The evidence submitted appears adequate to show the chemical composition of the product used and gives assurance that its purity and uniformity will be adequately safeguarded. The papers of Dr. Leake and of Leake and his collaborators are likely to have a favorable effect in challenging previous assumptions of effectiveness of several drugs. Compared with other amebacides, Carbarsone seems to be effective; but the recurrences noted in monkeys after treatment and temporary improvement suggest that a similar experience may be had in man, as, indeed, did occur in some cases. The clinical evidence as a whole is promising; but the Council agrees with Leake and his collaborators that more clinical evidence of a confirmatory nature is desirable. The Council therefore postponed consideration of Carbarsone (*p*-carbamino-phenyl arsonic acid) to await the development of further clinical evidence of its value, and voted to publish this preliminary report.

Committee on Foods

THE FOLLOWING PRODUCTS HAVE BEEN ACCEPTED BY THE COMMITTEE ON FOODS OF THE AMERICAN MEDICAL ASSOCIATION FOLLOWING ANY NECESSARY CORRECTIONS OF THE LABELS AND ADVERTISING TO CONFORM TO THE RULES AND REGULATIONS. THESE PRODUCTS ARE APPROVED FOR ADVERTISING IN THE PUBLICATIONS OF THE AMERICAN MEDICAL ASSOCIATION, AND FOR GENERAL PROMULGATION TO THE PUBLIC. THEY WILL BE INCLUDED IN THE BOOK OF ACCEPTED FOODS TO BE PUBLISHED BY THE AMERICAN MEDICAL ASSOCIATION.

RAYMOND HERTWIG, Secretary.

SWIFT'S GELATINS

Protector, Frezrite, Stabilo, Economix, Superla, Textura, Velvatex, Atlas, Superwhip, Premium and Cremelac Brands

Manufacturer.—Swift and Company, Chicago.

Description.—Granular plain gelatins of different jelly strengths; unsweetened and unflavored.

Manufacture.—Only skins of animals inspected and passed by the Bureau of Animal Industry of the U. S. Department of Agriculture are used in the manufacture of these gelatins. The dehaired skins after removal from the animals are promptly fleshed and placed in cold storage in preparation for shipment in refrigerated cars to the gelatin plants, where they are received in a hard frozen condition.

The frozen skins are thawed and then treated with either acid or alkali solution to convert the collagen into gelatin. The excess reagent is removed by washing or neutralization or both. The gelatin formed is extracted with hot water; the gelatin solution is filtered, concentrated and chilled to form jelly, which is spread on nets and dried in a current of warm filtered air. The dried gelatin sheets are broken up, ground and filled into paper lined barrels or paper cartons and distributed in bulk.

Complete laboratory analysis is made of each batch of gelatin, including moisture, ash, color, clarity, jellying strength, viscosity, keeping quality, arsenic, copper, zinc, sulphur dioxide, B. coli and total bacteria. The various grades of gelatin manufactured differ essentially in "jelly strength" or other properties adapting them to special uses. The "jelly strengths" range from 75 to 250 Gm. expressed as the number of grams load required to produce a 4 mm. depression by a circular plunger of one-half inch diameter of the surface of a gelatin jelly of 6⅔ per cent concentration that has been chilled at 10 C. for from sixteen to eighteen hours. The official Bloom method of the Edible Gelatin Manufacturers Research Society of America is used.

Chemical Composition (submitted by manufacturer).—

	per cent
Moisture	10.0–12.0
Ash	0.5– 2.0
Protein (N × 5.55)	86.0–90.0
Fat	0.3– 0.4

Copper (Cu)	5 parts per million
Zinc (Zn)	20 parts per million
Arsenic (As_2O_3)	less than 0.1 part per million
Sulphur dioxide	trace

Calories.—3.6 per gram; 103 per ounce.

Claims of Manufacturer.—Food gelatins designed for special uses, prepared from the edible skin of government tested animals; suitable for use in normal and restricted diets and in all food gelatin preparations.

PIXIE STRAINED WAX BEANS

Manufacturer.—Fruit Belt Preserving Company, East Williamson, N. Y.

Description.—Canned, sieved wax beans containing in large measure the mineral and vitamin content of the raw beans used.

Manufacture.—Locally grown wax beans are forced through production within a short time after receipt; only when necessary are they stored for a day or two. The beans are sorted to remove foreign material, washed in a circulating water tank, drained, hosed and blanched in boiling water for about five minutes and immersed in cold water. The blanched peas are ground, and cooked in live steam in covered, vented kettles. The broken down pieces are sieved. The edible portion is forced through a screen, the fibrous part being retained. The sieved material is adjusted to a definite specific gravity, canned and processed by essentially the same procedure as that described for Sieved Carrots (see THE JOURNAL, Nov. 14, 1931, p. 1467). The final processing involves forty minutes' heating at 115 C.

Chemical Composition (submitted by manufacturer).—

Specific gravity 20 C./20 C.	1.03
	per cent
Moisture	94.2
Total solids	5.8
Ash	0.6
Fat (ether extract)	0.03
Protein (N × 6.25)	1.1
Crude fiber	0.6
Carbohydrates other than crude fiber (by difference)	3.5

Calories.—0.2 per gram; 6 per ounce.

Vitamins; Micro-Organisms; Claims of Manufacturer.—See these sections for Pixie Strained Carrots.

KARO (Orange Label)

A table delicacy composed of corn syrup of the highest grade, granulated sugar and imitation maple flavor

Manufacturer.—Corn Products Refining Company, New York.

Description.—A table syrup; a corn syrup base with added sucrose, flavored with imitation maple flavor.

Manufacture.—This syrup is prepared by mixing corn syrup with a relatively small amount of sucrose. The mixture is flavored with imitation maple flavor.

The process of manufacture of the corn syrup is the same as that for Karo Syrup (Crystal White) (THE JOURNAL, Jan. 9, 1932, p. 143). The mixing of the corn syrup, sucrose and imitation maple flavor and the processing of the mixture are essentially the same as for Karo Syrup (Crystal White).

Chemical Composition (submitted by manufacturer).—

	per cent
Moisture	25.0
Ash	0.4
Fat (ether extract)	0.0
Protein (N × 6.25)	0.2
Dextrins (by difference)	35.6
Maltose (method by Wesener and Teller, J. Indust. & Engin. Chem. 7: 1009, 1916)	21.8
Dextrose (method by Wesener and Teller, J. Indust. & Engin. Chem. 7: 1009, 1916)	7.3
Sucrose (estimated from formula)	9.7
Titratable acidity as HCl	0.01
Sulphur dioxide less than	0.003

Calories.—3.0 per gram; 85 per ounce.

Claims of Manufacturer.—See this section for Karo (Crystal White).

THE JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION

535 NORTH DEARBORN STREET - - - CHICAGO, ILL.

Cable Address - - - - "Medic, Chicago"

Subscription price - - - - - Seven dollars per annum in advance

Please send in promptly notice of change of address, giving both old and new; always state whether the change is temporary or permanent. Such notice should mention all journals received from this office. Important information regarding contributions will be found on second advertising page following reading matter.

SATURDAY, JANUARY 16, 1932

THE FUEL OF THE BRAIN

The machinery of life obtains its power from energy liberated by the oxidation of foodstuffs. For a long time it was the belief that fat, dextrose and protein enter the blood stream and are burned in varying combinations by each organ according to its requirements. It is now generally agreed that muscle satisfies its needs for energy by the oxidation of both fat and dextrose.[1] Do other organs obtain their energy from the same substances? For the brain the answer is now at hand. Recent work points to carbohydrate as the sole source of energy of this highly specialized tissue.

In 1929, Himwich and Nahum [2] reported a series of observations on the brain of dogs, which indicated clearly that this organ utilizes carbohydrates exclusively as a source of energy. The character of the foodstuff oxidized was not altered by anesthetics, since otherwise normal unanesthetized animals yielded the same results. A further most important observation was that in depancreatized animals—individuals that had lost the capacity of oxidizing sugar—the brain continued to utilize carbohydrate as its source of energy despite the disappearance of insulin from the body of the experimental animal. Here, then, is a case in which lack of the pancreatic hormone does not cause an organ to burn fat as its source of energy.

A study of the venous blood of the brain in both diabetic and normal animals showed the presence of less dextrose and lactic acid than was present in the arterial blood (going to the brain).[2] This fact, considered in the light of the observations of Holmes and Ashford [3] on the nonstorage of glycogen, dextrose and lactic acid, makes it doubly clear that these substances are utilized by the brain as its source of energy. Lennox [4] more recently has obtained striking corroboration of the foregoing conclusion in unanesthetized patients. He studied simultaneously the brain and the muscles of the leg. While the contractile tissue of his subjects subsisted almost entirely on fat, the brain utilized carbohydrate for its requirements. Here, then, is evidence of the unusual phenomenon of an organ, the brain, which lives exclusively on sugar when other organs burn fat. Furthermore, even in the absence of insulin, carbohydrate remains the sole substance utilized by the brain for its requirements of energy, a matter perplexing to many physiologists.

Since it is generally believed that oxidations of dextrose can occur only in the presence of insulin, it becomes clear that dextrose as such is not oxidized by the brain. How, then, is it utilized? The answer is afforded by the investigation of Holmes,[5] who studied the excised brain and showed that, even in the absence of dextrose, its oxidations continue satisfactorily, provided only that lactic acid is present (or added to the preparation). Furthermore it was found that, when dextrose was supplied, the oxidations by the brain tissue progressed, provided dextrose could be converted to lactic acid, and not otherwise. Dextrose, then, is the precursor of lactic acid, which is probably the sole fuel of the living brain. By subsisting on lactic acid the brain becomes independent of insulin, a circumstance obviously of the utmost importance to the diabetic patient. How many other organs in the body depend on a similar mechanism is still to be determined.

1. Himwich, H. E., and Rose, M. I.: Studies in the Metabolism of Muscle: II. The Respiratory Quotient of Exercising Muscle, Am. J. Physiol. **88**: 663 (May) 1929.
2. Himwich, H. E., and Nahum, L. H.: Respiratory Quotient of the Brain, Am. J. Physiol. **90**: 389 (Oct.) 1929.
3. Holmes, E. G., and Ashford, C. A.: Lactic Acid Oxidation in Brain with Reference to the "Meyerhof Cycle," Bioch. J. **24**: 1119, 1930.
4. Lennox, W. G.: The Cerebral Circulation: XIV. The Respiratory Quotient of the Brain and of the Extremities in Man, Arch. Neurol. & Psychiat. **26**: 719 (Oct.) 1931.
5. Holmes, E. G.: Oxidations in Central and Peripheral Nervous Tissue, Biochem. J. **24**: 914, 1930.

THE HEALTH OF THE ARMY

For several reasons the vital statistics of the regular army of the United States during a time of peace like the present should supply valuable information regarding a variety of problems dealing with the incidence of disease and injuries, the treatment of common disorders, and the possibilities of preventive medicine. Military personnel is selected with considerable care to avoid inclusion of men who are physically handicapped or mentally undesirable. The hazards to which they are exposed are not unusual, although part of the service involves residence in many parts of the world. The medical vicissitudes are under the direct observation of physicians specially detailed for the work. The records are carefully collated. According to the latest report [1] of the Surgeon General, Major General Patterson, the average daily strength of the male military personnel of the army for the calendar year 1930 was 137,299. It included 11,434 officers, 114,559 white enlisted men, 3,896 colored enlisted men, 6,382 Filipinos, and 1,028 Porto Ricans. This is the equivalent of a moderate sized American city in population. The annual admission to sick report from all causes (608 per thousand men) was the lowest one

1. Report of the Surgeon General, U. S. Army, to the Secretary of War, 1931, Washington, Government Printing Office.

recorded in the history of the army. The next lowest rate (614) was in 1919, when a large part of the war army, which had been immunized against infectious diseases by service in the camps in the United States and Europe, was being demolished. There is now only one-fourth as much sickness in the army as there was 100 years ago, and only one-half as much as during the period just prior to the Spanish-American War.

This is an interesting record of progress for which the development of medicine is largely responsible. The Surgeon General points out that the most notable advance has been in the control of communicable diseases, and especially of those transmitted through the gastro-intestinal tract; namely, typhoid, diarrhea and dysentery. During recent years, those three diseases combined have caused less than 600 cases of sickness during a year's time in each 100,000 men in our army scattered throughout this country, the Philippine Islands, Panama, Hawaii and Porto Rico, as compared with 85,000 cases in this country alone, a century ago. The reduction in the number of cases of malarial fevers, he adds, has also had a material influence in lowering the sick rate.

It is interesting to learn in what respects the record is not so encouraging. The report shows that there has been little decline in the prevalence of acute respiratory infections, including the nonepidemic forms, influenza and the pneumonias. The ordinary common colds and bronchitis are always prevalent among all races and all classes. Every year they are responsible for much of the sickness not only in the army but also in civil life. The control of the respiratory infections has the same importance in the army as it does in civilian life. One of the principal reasons for the excellent army health record of 1930 has been the relatively small incidence of what is often termed acute influenza. Hawaii has maintained its reputation as being the most healthful climate in which our troops are stationed.

It is a significant commentary on our modern life, as exemplified in the experience of the army, that although there has been a decrease in the number of deaths from preventable diseases there has been a relative increase in the ones from external causes. Deaths no longer occur in Indian fights and there have been none in military combats since the World War; but, according to the Surgeon General, as a result of the use of automobiles, airplanes and other types of machinery, violent causes are now responsible for a much larger percentage of the total deaths than formerly. Preventive medicine is thus brought face to face with menaces to life utterly beyond its usual professional sphere. In an army that had about 6,800 patients in the hospital each day at a cost of $5.07 per patient day the mortality was determined in many instances, as in war, by factors beyond medical control. As the army report informs us, during the year 1930 the leading cause of death was not an infectious disease but automobiles. This is the first year that automobiles have held this unenviable record. Suicides, which during eight of the preceding nine years had headed the list, was second. Tuberculosis stood third, with drowning and cancer in fourth and fifth positions. There were fewer deaths during 1930 than in 1929 from suicides and drowning, and fewer from airplane accidents than during any year since the World War. It is the foremost province of medicine to attempt to avert death by disease. Accident and human folly demand the concern of the layman as well as the physician.

THE THEBESIAN VESSELS AND THE NUTRITION OF THE HEART

The belief that the heart is totally dependent on the coronary arteries for its nutritive supply is quite firmly intrenched in the medical mind. The numerous cases of speedy death following sudden closure of the coronary vessels as well as the rapidity with which cardiac infarction occurs when a branch of a coronary artery is thrombosed or experimentally ligated has lent strong support to this view. Nevertheless, the pathologist often finds coronary arteries so narrowed by disease that they could have supplied little or no blood to their respective areas in the myocardium, yet infarction had not occurred. Undoubtedly a small number of cases in which closure of the coronary arteries fails to produce infarction may be explained by the presence of abnormal arterial anastomoses, which are occasionally found to be present in hearts. But how is one to explain those instances in which both coronary arteries are completely occluded [1] and yet the heart continues to carry on its usual activity? On what other channels can it rely for its nutritional requirements?

Attempts to answer this question have focused the attention of physiologists on that system of vessels in the heart first discovered by Vieussens in 1706 and completely described by Thebesius, whose name they now bear. Thebesius, as well as many of his successors, believed that these vessels were accessory channels to the coronary veins serving to assist them in the conveyance of a portion of the venous blood from the capillary bed directly into the heart cavities. Substantiating this view, Markwalder and Starling [2] showed that about 40 per cent of the venous blood of the heart of the dog is returned to its chambers through the thebesian openings while 60 per cent is delivered through the coronary veins. If this is so, certainly the thebesian vessels may be an important factor in the maintenance of the blood circulation in the heart itself. It seems strange that a system possessing such important possibilities has received so little study, and that opinions concerning its function should still be divided.

1. Wearn, J. T.: The Rôle of the Thebesian Vessels in the Circulation of the Heart, J. Exper. Med. **47**: 293 (Feb.) 1928.
2. Markwalder, J., and Starling, E. H.: A Note on Some Factors Which Determine the Blood Flow Through the Coronary Circulation, J. Physiol. **47**: 275, 1913.

Pratt,[3] in 1897, was able to initiate and maintain the heart beat in isolated cats' hearts for hours by introducing well oxygenated, defibrinated blood into the right ventricle. That this blood found its way into the coronary veins was readily demonstrated by the appearance of a small but constant outflow of dark venous blood when a superficial vein was incised. Apparently, under these conditions the myocardium was receiving its nutritive supply from the ventricular cavity through the thebesian vessels. It seemed from this that in abnormal conditions of reduced or absent circulation through the coronary system, such as is found clinically in sclerosis or occlusion of a coronary artery, blood may enter the myocardial tissue directly from the heart chambers. Pratt, in fact, concluded that "a new and effective mechanism for the rescue of the cardiac muscle from threatened infarction is found in the nutrition through the vessels of Thebesius." Wearn[1] has reached the similar conclusion "that in the event of a gradual closure of the orifices of the coronary arteries the thebesian vessels can supply the heart muscle with sufficient blood to enable it to maintain an efficient circulation." Certainly these observations possess real clinical interest.

These studies were made on hearts that were not beating against any head of pressure and under conditions not approximating those found in the living animal. Accordingly, Stella[4] ingeniously put the problem to the test in a living heart by separating the coronary system from the ventricular cavities, perfusing the two simultaneously but independently. When the coronary perfusion was suddenly cut off, so that the pressure in the arteries fell to zero, the heart continued to beat for only a short time and fluid was not forced from the ventricular cavities into the coronary arteries; nor was this investigator able to confirm Pratt's results on the delivery of blood from the chambers of the heart into the coronary veins. The experimental conditions in these studies closely approximated the hemodynamics of the normal heart. Stella concluded, therefore, that normally the thebesian veins, being closed during systole and filled from the coronary capillary bed during diastole, cannot exert a significant influence on the blood supply to the heart muscle.

It is important to note that Stella's observations were obtained on hearts suddenly and completely deprived of their coronary circulation—an overwhelming and rapidly fatal calamity. Obviously this cannot be too closely compared with those clinical instances in which the coronary blood supply is gradually reduced by progressive disease. The time factor may be most important in allowing the thebesian vessels to take over functions which, under normal conditions, they may not subserve. It is true that the thebesian veins do not prevent infarction from taking place when a coronary artery is suddenly and completely occluded; but given sufficient time can these vessels assume the function of the coronary arteries? Is it possible for them to contribute a share to the total nutritional supply of the myocardium, in this manner delaying the processes leading to infarction? The question is still an open one; further studies are urgently needed to aid in solving the problem.

3. Pratt, F. H.: The Nutrition of the Heart Through the Vessels of Thebesius and the Coronary Veins, Am. J. Physiol. **1**: 86, 1898.
4. Stella, G.: The Part Played by the Thebesian Vessels in the Blood Supply to the Heart, J. Physiol. **73**: 36, 1931.

Current Comment

NOW IS THE TIME TO REMIT

The colored slip in THE JOURNAL, this week, is a reminder that subscription and Fellowship dues for 1932 are now payable. Thousands have already sent in their remittances. In fact, the number of payments at this time is almost twice what it was last year at the same date. Naturally, those who have paid will disregard the colored slip. All others are earnestly requested to make remittance without delay and thereby obviate the necessity for sending individual bills. Special attention is called to the fact that the colored slip is not only a statement but is also cut, gummed and stamped to form a little envelop that does not require postage. All the special journals published by the Association and *Hygeia,* the Health Magazine, are listed with subscription prices on the colored slip. One remittance can be made to take care of all subscriptions desired.

THE PROGRESS OF NUTRITION AS A SCIENCE

The advance in our knowledge of nutrition represents one of the most significant factors for the welfare of mankind that have developed in recent years. So great, indeed, has been the amount of attention given to this subject that the editors of the newly established and published periodical *Nutrition Abstracts and Reviews* find it necessary to survey 450 periodicals regularly in order to include abstracts on this material. The first number of this publication provides a survey of nutrition and human welfare by the eminent contributor to our knowledge of vitamins Sir Frederick Gowland Hopkins.[1] He emphasizes a point to which little consideration is given in most studies of this subject; namely, the difference between the type of nutrition enabling survival and that which may be characterized as optimum nutrition. Most people take it for granted that the type of human being that constitutes what is called a normal man today is the best type of human being that can be produced, notwithstanding the fact that careful breeding and scientific housing and feeding of animals enable the breeder to develop superlative stock. Sir Frederick traces the development of mankind from the early prehuman ancestry, the frugivorous type, through the period when man became a hunter, when he developed an appetite for carnivorous material and when simultaneously there came a great development of hands and of brain. The

1. Hopkins, F. G.: Nutrition and Human Welfare, Nutrition Abstr. & Rev. **1**: 3 (Oct.) 1931.

impulse that made man an artificer was probably hunger rather than esthetic desire. The development of agriculture modified the diet still further by introducing the use of cereals to replace flesh in increasing proportions. Hopkins is convinced that the needs of nutrition and the kind and amount of foods geographically available have played a great part in determining the destiny of races. Hence, tradition rather than science has tended to guide our point of view. Far too long it has been taken for granted that a sufficient bulk of food to satisfy the elements of hunger means adequate feeding. Now it is recognized that the quality of food is as important as its quantity and that deficiencies of certain substances have far reaching effects on growth and on health. The uninformed are inclined to consider technical advances that affect everyday life as representing unnecessary scientific refinements. In the field of diet, every one who has ever suffered with indigestion considers himself an authority. When the majority of human beings have sufficient knowledge to appreciate the true import of the many factors already established as of importance in nutrition, much good will have been accomplished for mankind in general.

NOISE

The effects of continuous noise on the human body and the nervous fatigue induced by excessive noise are difficult to evaluate. An engineer[1] says that "within a generation, noise will vie with disease unless the same mechanical ingenuity that has called the mechanical robot of the age into existence shall also be able to endow it with a soul of quiet." City dwellers are saturated with noises that emanate from street traffic, railways, radios, hucksters, factories and what not. The consequence is lessened efficiency, irritability and, in some cases, neurosis. The growing menace of noise and vibration has already called forth an emphatic protest in various parts of the world. The effect of noise on the human organism is being widely investigated. To date, research has shown that sudden noise increases the rate of the heart and respiration and the blood pressure of man and animals. A significant fact shown by experimentation is that the mental effort of the more highly developed individuals is hindered by noise, whereas less mentally developed persons seem to be helped in this way. Sudden noises cause fear reactions which become apparent in muscular tension. Muscular relaxation is difficult, if not impossible, in a noisy environment. The Noise Commission of the City of New York has made the first comprehensive measurement of the average noise level of city streets, taking more than 7,000 readings at many different places. The relative noise level was determined by instrumental measurement of the intensity of sound. The results of the survey show that there are many places in New York where a Bengal tiger could roar without being heard at a distance of twenty feet. Of the complaints of noise in New York, 53 per cent of a total of 11,068 concerned automobile traffic and rail transportation. For years this problem has been carefully studied in England, where one of the great sources of noise is machinery used in the manufacture of textiles. As long ago as 1917, a National Fatigue Elimination Day was initiated as a means of directing attention to preventable noise. In the United States, measures have been taken in several places to prevent noise. Some cities have experimented with the "noiseless" street car. Patented noise-preventing rails for street railways are in use in others. The American Electrical Railway Engineering Association has appointed a committee to study actively the problem of noise and vibration. The prevention of noise is largely an engineering problem. While at present certain legal restrictions on noise may be properly imposed, scientific research is necessary to set up definite standards for measuring the quantity and quality of noise in relation to its effect on the individual.

1. Slocum, S. E.: Noise and Vibration Engineering, New York, D. Van Nostrand Company, Inc., 1931.

Association News

THE NEW ORLEANS SESSION

Time Limit for Applications for the Scientific Exhibit

The Committee on Scientific Exhibit calls attention to the fact that all applications for the Scientific Exhibit must be in the hands of the director before January 20. Any who desire an application blank may obtain it by sending a request to Director, Scientific Exhibit, American Medical Association, 535 North Dearborn Street, Chicago.

For the New Orleans Session, twelve sections will sponsor section exhibits. Applications of participants in any of the section exhibits should be sent at once to the chairman of the committee on section exhibit, as follows: For the Section on Radiology, address Dr. Charles L. Martin, Baylor University Hospital, Dallas, Texas; for the Section on Gastro-Enterology and Proctology, Dr. A. H. Aaron, 40 North Street, Buffalo, N. Y.; for the Section on Nervous and Mental Diseases, Dr. Thomas J. Heldt, Henry Ford Hospital, Detroit, Mich.; for the Section on Practice of Medicine, Dr. L. G. Rowntree, Mayo Clinic, Rochester, Minn.; for the Section on Orthopedic Surgery, Dr. E. B. Mumford, 820 Chamber of Commerce Building, Indianapolis; for the Section on Obstetrics, Gynecology and Abdominal Surgery, Dr. E. D. Plass, University Hospital, Iowa City; for the Section on Preventive and Industrial Medicine and Public Health, Dr. P. A. Davis, 1436 Delia Avenue, Akron, Ohio; for the Section on Dermatology and Syphilology, Dr. Fred D. Weidman, Thirty-Sixth Street and Hamilton Walk, Philadelphia; for the Section on Laryngology, Otology and Rhinology, Dr. Austin A. Hayden, 25 East Washington Street, Chicago; for the Section on Ophthalmology, Dr. Parker Heath, 1025 David Whitney Building, Detroit; for the Section on Diseases of Children, Dr. F. Thomas Mitchell, 376 South Bellevue, Memphis, Tenn.; for the Section on Urology, Dr. George Gilbert Smith, 6 Commonwealth Avenue, Boston.

A splendid interest has been shown in the Scientific Exhibit for the New Orleans Session, and from the applications already received the Exhibit will be outstanding.

MEDICAL BROADCAST FOR THE WEEK

American Medical Association Health Talks

The American Medical Association broadcasts on Monday, Wednesday and Friday from 2:25 to 2:30 p. m. over Station WBBM (770 kilocycles, or 389.4 meters) of the Columbia Broadcasting System.

The program for the week is as follows:

January 18. Picking a Model for Your Son.
January 20. Epilepsy and Epilepsy Nostrums.
January 22. The Real Thing in the Health Program.

Medical News

(PHYSICIANS WILL CONFER A FAVOR BY SENDING FOR THIS DEPARTMENT ITEMS OF NEWS OF MORE OR LESS GENERAL INTEREST: SUCH AS RELATE TO SOCIETY ACTIVITIES, NEW HOSPITALS, EDUCATION, PUBLIC HEALTH, ETC.)

ARKANSAS

Society News. — At the meeting of the Greene County Medical Society, recently, the speakers were Drs. Robert W. Cupp, Beech Grove, treatment of pneumonia, and James A. Dillman, Paragould, salpingitis.——Drs. Archibald C. Lewis and Henry G. Hill, Memphis, Tenn., addressed the Mississippi County Medical Society, recently, on sinus trouble and management of fractures, respectively.——The Fort Smith Clinical Society was addressed, recently, among others, by Major James M. Troutt, Hot Springs, on "Liver Function in Relation to Disease"; Dr. Wilson A. Myers, Kansas City, Mo., "Congenital and Acquired Lesions of the Lumbosacral Region" and Drs. Charles S. Means and Vogel J. Jeffery, "Acute Respiratory Infections" and "Diathermy in General Medicine," respectively. ——Dr. George V. Lewis has been appointed head of the department of surgery at the University of Arkansas School of Medicine, Little Rock.

COLORADO

Revocation Affirmed.—Judge Charles C. Sackman of the Denver district court, Dec. 21, 1931, affirmed the action of the state board of medical examiners in revoking the license of Dr. Kalmen C. Sapero on the ground that he had been guilty of unprofessional and dishonorable conduct in his method of advertising his visits to various cities and towns in Colorado. Dr. Sapero's license was revoked by the Colorado State Board of Medical Examiners, July 7, 1931 (THE JOURNAL, Aug. 22, 1931, p. 545).

CONNECTICUT

Survey of Connecticut's Shore Waters.—The Connecticut State Department of Health recently completed a survey of the sanitary condition of Connecticut's shore waters on Long Island Sound. The survey was carried on in the summers of 1929, 1930 and 1931, and was undertaken to compile specific data as to the sanitary condition of bathing areas and to determine the "danger spots" along the shore which are seriously affected by sewage pollution. Sampling stations were chosen at intervals of about 1,000 feet along the entire Long Island Shore in the state. Four samples for bacteriologic analysis were collected at each station to represent conditions at four different stages of tide, and were taken in almost every case from a boat in from two to six feet of water. These were examined only for the presence of organisms of the coli-aerogenes group. The sanitary survey included the location of sewer outlets along the entire shore with the accumulation of data as to the flows of sewage and contributing population. According to the conclusions of the board of health, many miles of the state's shore were found to be in excellent sanitary condition. The effect of harbor pollution in Connecticut is rapidly dissipated by dilution available in Long Island Sound, so that the sewage from the cities and towns is not a factor, to any great extent, in polluting the main body of water in the sound. The principal considerations are as to the harbor waters and waters in close proximity, as the harbors of many of the cities and towns are highly polluted.

DISTRICT OF COLUMBIA

Society News.—Dr. Victor R. Alfaro addressed the Louis Mackall Medical Society recently on "Relation of Dental Infections to Maxillary Sinusitis."——The Society of Interns was addressed recently by Hon. Frederick Fenning on "The Doctor in His Legal Relations."

Dr. Portmann Gives Course in Otolaryngology.—Prof. Georges Portmann of the University of Bordeaux, France, will conduct a brief course in otolaryngology in Washington, February 1-6. The fee for the course will be $35. The class will be limited to fifty members. Further information may be had from Dr. James A. Flynn, 1511 Rhode Island Avenue, N.W., Washington, D. C.

Personal.—The Order "Al Merito" of Ecuador was recently presented to Surg. Gen. Hugh S. Cumming, director of the Pan American Sanitary Bureau, in recognition of the cooperation of that bureau with the government of Ecuador in a sanitary campaign throughout the republic and especially in Guayaquil, which resulted in that city's being declared a clean port of class A, according to the *Bulletin* of the Pan American Union.

District Society to Publish Journal. — Beginning with January, the Medical Society of the District of Columbia is publishing a monthly medical journal entitled the *Medical Annals of the District of Columbia.* It will be a revival of the *Washington Medical Annals,* which ceased to exist in 1920. It is planned to publish original papers, editorials and activities of the profession throughout the world. The editors will be Dr. Wallace M. Yater, professor of medicine, Georgetown University School of Medicine, and Dr. Coursen B. Conklin, secretary of the Medical Society of the District of Columbia.

FLORIDA

Personal.—Dr. Thomas H. Stokes has been appointed health officer of Pensacola to succeed Dr. William D. Noble, resigned. ——Dr. Sheldon Stringer resigned as superintendent of the Tampa Municipal Hospital, November 1; he plans to resume private practice. —— Dr. Edward Jelks was recently elected president of the Jacksonville Historical Society.——Dr. James R. McEachern has been appointed health officer of Tampa to succeed Dr. Charles W. Bartlett, Jr.

Society News.—The Escambia County Medical Society and the Walton-Okaloosa Counties Medical Society were addressed, Nov. 10, 1931, by Drs. James M. Hoffman and Alvyn W. White, Pensacola, among others, on "Use of Local Anesthesia in the Treatment of Fractures" and "Observations on the Treatment of Empyema in Children by Aspiration," respectively. ——The Florida Radiological Society was formally organized, Nov. 14, 1931, in St. Petersburg; meetings will be held in May and November. Dr. Lester W. Cunningham, Jacksonville, was elected president; Dr. Orion O. Feaster, St. Petersburg, vice president, and Dr. Frederick K. Herpel, West Palm Beach, secretary.

ILLINOIS

Society News.—The La Salle County Medical Society was addressed, January 7, by Drs. Archibald L. Hoyne and Emil D. W. Hauser, Chicago, on poliomyelitis and low back pain, respectively.——Dr. Maximilian Kern, Chicago, addressed the Rock Island County Medical Society, January 12, on "Nonsurgical Types of Goiter."——At the January 5 meeting of the Peoria City Medical Society, Drs. Wilber E. Post and William A. Hoffman, Chicago, discussed the newer phases in studies of nephritis. —— Dr. John T. Nerancy, South Bend, Ind., addressed the Kankakee County Medical Society, Dec. 17, 1931, on "Cautery Surgery of Cancer."——Dr. Hugo R. Rony, Chicago, addressed a joint meeting of the Will-Grundy County Medical Society and the woman's auxiliary in Joliet, January 13, on "Obesity and Leanness."——Dr. Grandison D. Royston, St. Louis, addressed the St. Clair County Medical Society, January 7, on "Use and Abuse of Anesthetics and Pituitrin in Pregnancy."

Chicago

Discussion on Treatment of Mentally Ill.—"What Is Illinois Going to Do About the Mentally Ill?" is the subject of a public discussion to be held by the Chicago Medical Society, January 20. Rodney H. Brandon, director, state department of public welfare, Springfield, Ill., representing the state of Illinois, will speak on "Illfare and Welfare." Dr. Charles F. Read, superintendent, Elgin State Hospital, Elgin, Ill., representing the medical profession, will discuss "What May the State Do to Solve the Problems the Department Raises?" Dr. John R. Harger will preside at the meeting, which will be held in the Medical and Dental Arts Building. The public is invited. Preceding the meeting, an informal dinner will be held in honor of the two speakers.

Tumor Clinic Established. — A tumor clinic has been organized at the University of Chicago to afford a close cooperation between the departments of surgery and gynecology and the division of roentgenology, in the treatment of neoplastic disease and such other cases as require radiation therapy, exclusive of all dermatologic conditions. It consists of two divisions, surgical and gynecologic. The services of the tumor clinic are optional to staff members of the University of Chicago Clinics. Its organization is not intended to curtail the activities of any physician in the treatment of cancer. No patient will be admitted directly to the tumor clinic from the admitting office unless referred expressly to it by an outside physician. One of the principal functions of the clinic will be the follow up of all cases.

Society News.—At a joint meeting of the Chicago Roentgen Society and the Chicago Society of Industrial Medicine and Surgery, January 13, the speakers were Drs. Samuel C.

Plummer on "Fractures of the Spine"; Paul G. Dick, "Anomalies of the Spine," and Maximilian J. Hubeny, "Hypertrophic Spondylitis Accompanied by Radiculitis."——The Chicago Council of Medical Women was addressed, January 8, by Dr. Carroll C. L. Birch on "Hemophilia"; Rosalie M. Parr, "A Discussion of Rare Element Salts as Erythropoietic Agents," and Dr. Evelina W. Ehrmann, "Anemia Neonatorum."——Among others, Drs. Dallas B. Phemister and Lois Day addressed the Chicago Surgical Society, January 8, on "Calcium Carbonate Gallstones," and Dr. Carl A. Hedblom, "Obliteration of Large Chronic Empyema Cavities by Combined Conservative and Radical Measures."——At the meeting of the Chicago Orthopedic Club, January 8, Drs. Joseph Miller and Edward L. Compere spoke on "Classification of Chronic Arthritis Based on Etiology and Pathology" and "Bone Cyst and Giant Cell Tumor—Their Relation to Infection," respectively.—— Dr. George J. Rukstinat, among others, addressed the Chicago Pathological Society, January 11, on "Hemorrhage into the Stroma of Both Ovaries—A Sequel of Mitral Stenosis"; Dr. Hamilton R. and Dora Fishback spoke on "Phosphorus Partition in Experimental Degeneration of Striated Muscle."——The Society of Medical History of Chicago was addressed, January 14, by Drs. Lloyd L. Arnold on "Pettenkofer"; Milton G. Bohrod, Decatur, Ill., and William F. Petersen, "Medical Notes on the Arthacastra of Kautilya." Dr. Bohrod also spoke on "Genealogy of Medical Thought," and Dr. Petersen on "Count Struensee."——Dr. Samuel T. Orton, New York, is addressing the Chicago Pediatric Society today on "Influence of Cerebral Dominance on the Acquisition of Language."

IOWA

Sioux Valley Medical Association.—The annual meeting of the Sioux Valley Medical Association will be held in Sioux City, January 26-27, with headquarters at the Martin Hotel. The program will include lectures, clinics, papers and discussions, as well as exhibitions of moving pictures depicting surgical and obstetric operations. The physicians on the program will be Drs. Clyde A. Roeder, Omaha; Frank C. Neff, Kansas City, Mo.; Hillier L. Baker, Chicago; Walter C. Alvarez and Louis A. Buie, Rochester, Minn.; Harry E. Mock, Philip Lewin, James G. Carr and Anton J. Carlson, Chicago; Elmer L. Sevringhaus, Madison, Wis., and Edward A. Doisy, Ph.D., St. Louis.

Bureau of Maternity and Child Hygiene.—Through a legislative appropriation of $14,350 and one of $5,000 by the state university, the Iowa State Department of Health, July 1, 1931, organized the bureau of maternity and child hygiene. The maternity program of the bureau has been divided into three sections: prenatal period, delivery and puerperium. As midwives are not recognized by law in Iowa, it is proposed that the bureau visit each midwife and give her all possible help. Efforts will be made to discourage from further practice those whose work is unsatisfactory and who do not show promise of improvement. In order to carry out an extensive program of child hygiene, it is hoped to introduce an adequate health education course in every teacher training institution, and then to include health education, properly graded, in the curriculums of the elementary grades, junior high and high schools and colleges. The program of the bureau is based on the findings and recommendations of the White House Conference for Child Health and Protection as set forth in the children's charter. The bureau will send printed information on request and give assistance to lay groups in arranging study programs. With the aid of the state medical society, it will help to provide speakers for lay groups. For the group of expectant mothers unable to pay for medical service, prenatal conferences will be held. In November, 1931, three two-day maternity institutes were arranged by the bureau for the public health nurses of Iowa. Dr. Clara E. Hayes, formerly of New York, is full time director of the recently established bureau.

KANSAS

Society News.—The Sedgwick County Medical Society was addressed, January 5, by Drs. René M. Gouldner on "A Surgeon of Napoleon"; George E. Cowles, "Carcinoma and Sarcoma Coexistent in the Same Uterus," and Hal E. Marshall, Wichita, "The Doctor Is Checked Up." The society will be addressed, January 19, by Drs. Frank R. Teachenor, Kansas City, Mo., and Harold W. Palmer on "Brain Injuries" and "Hypothyroid States."

Licenses Revoked.—At the meeting of the Kansas State Board of Medical Registration and Examination, Dec. 8-9, 1931, the Kansas license of Dr. George W. Thume, La Harpe, Ill., was revoked on account of his having been found guilty of felony and gross immorality; the license of Dr. Arthur H. Nossaman, formerly of Whitewater, was revoked on a similar charge. Dr. Nossaman is at present serving a term in the federal prison at Leavenworth. He had previously served a term in the Kansas state prison on a charge of manslaughter.

MAINE

Society News.—Dr. Leopold O. Roy gave the presidential address before the Androscoggin County Medical Society, Dec. 10, 1931, at Lewiston, on heredity.——At the fifty-fifth annual meeting of the Portland Medical Club, Dec. 1, 1931, Dr. Philip P. Thompson spoke on "Medical Delusions, Past and Present." Dr. Henry M. Swift gave the presidential address on "Heredity and Environment."——Dr. Henry M. W. Gray, Montreal, gave an illustrated demonstration of certain developmental abnormalities of the colon and a discussion of their effects and treatment before the meeting of the Kennebec County Medical Association, Nov. 10, 1931, in Togus.——A moving picture film on spinal anesthesia featured the meeting of the Knox County Medical Society, Dec. 8, 1931.——The Penobscot County Medical Society was addressed, Dec. 15, 1931, by Dr. Martin J. English, Boston, on "Newer Aspects of Infant Feeding."

MARYLAND

Institute on Public Health Nursing.—The state department of health will conduct a two weeks' institute on public health nursing, beginning January 18, at the Johns Hopkins University School of Hygiene and Public Health, with a limited enrolment of twenty-five. Those assisting in the course are Drs. William W. Ford, Allen W. Freeman, Wade H. Frost, Esther L. Richards, Charles R. Austrian, Edwards A. Park, all of Baltimore; Benjamin F. Royer, Philadelphia; and Janet Howell Clark, Ph.D., Lowell J. Reed, Ph.D., and Elmer V. McCollum, Sc.D., all of Baltimore.

New University Hospital Building.—Plans for the new $1,500,000 building for the University Hospital, University of Maryland, will be submitted to the board of regents at its next meeting. Funds voted at the last session of the general assembly will be made available in two instalments in February and August. Plans call for a 400 bed hospital in the shape of a cross, with provision for 250 training beds. The remaining accommodations will be for persons of moderate means, including a few private rooms. The building, which will be erected either on the site of the present hospital or in the vicinity of the other university buildings about Lombard and Greene streets, will be twelve or thirteen stories high.

Lectures at University of Maryland.—The division of medical extension of the University of Maryland has announced a series of lectures being held in the chemical amphitheater in the Administration Building, Baltimore. In this series, Dr. John M. T. Finney held a clinic, January 7, on surgical diagnosis, and Dr. Thomas R. Boggs, a medical clinic, January 14. Dr. Charles R. Austrian will give a medical clinic, January 21; Dr. Edward Francis, Washington, D. C., a clinical lecture on tularemia, January 28; Dr. Walter E. Dandy, neurosurgical clinic, February 24; Dr. Ray W. Matson, Portland, Ore., "Surgical Treatment of Pulmonary Tuberculosis," February 11, and Dr. Walter M. Simpson, Dayton, Ohio, "Recent Developments in Undulant (Malta) Fever," February 18.

MASSACHUSETTS

Personal.—Dr. Earl K. Holt, formerly of Columbus, Ind., has been appointed superintendent of the Medfield State Hospital.——Dr. Edward K. Ellis has been made professor of ophthalmology at Tufts College Medical School, and Dr. Allen Greenwood has been made professor emeritus.

Public Lectures.—Free public lectures on medical subjects are being given during January, February and March at the Harvard Medical School as follows:

January 3—Philip Bard, Ph.D., "Modern Conceptions of the Brain at Work."
January 10—Dr. Robert B. Greenough, "Cancer."
January 17—Dr. Chester M. Jones, "Dietary Habits in Relation to Indigestion."
January 24—Magnus I. Gregersen, Ph.D., "The Rôle of Water in the Body."
January 31—Dr. Hermann L. Blumgart, "Pneumonia."
February 7—Dr. Roy G. Hoskins, "The Glands of Internal Secretion."
February 14—Dr. George W. Holmes, "What the X-Ray Can and Cannot Do."
February 28—Dr. Thomas D. Jones, "Rheumatic Heart Disease in Children and Adults."
March 6—Dr. Leroy M. S. Miner, "White House Conference and Oral Hygiene."
March 13—Dr. Francis M. Rackemann, "Asthma, Hay Fever and Allied Conditions."
March 20—Dr. Marius N. Smith-Petersen, "Backache, Lumbago and Sacro-Iliac Troubles."

MINNESOTA

Personal.—Dr. Archie M. Smith will succeed Dr. Herman W. Froehlich as city physician at Thief River Falls.——Dr. Roderick F. McHugh was recently elected mayor of Aitkin.——Dr. John L. Rothrock, St. Paul, has been promoted to professor of obstetrics and gynecology at the University of Minnesota Medical School; he has retired from active practice.

County Society's Program.—A demonstration of emergency aid by members of the Minneapolis Fire Department was given before the Hennepin County Medical Society, Dec. 30, 1931. The meeting, January 6, was devoted to case reports. Dean Frederick J. Wulling, University of Minnesota College of Pharmacy, addressed the society, January 13, on "Some Important U. S. P. and N. F. Preparations Versus Proprietary Drugs." Paul Luckenbach, engineer, scientific staff, General Electric Company, will speak, January 20, on "Physics, Biological Actions, Artificial Production and Review of Latest Discoveries in Radiation Energy."

Symposium on Fractures.—A discussion of the modern treatment of fractures will be held, February 3-4, in Minneapolis, under the joint auspices of the Minneapolis Regional Subcommittee of the General Fractures Committee of the American College of Surgeons and the Minneapolis Surgical Society. A symposium will be held by the Hennepin County Medical Society, February 3. The program, February 4, will be entirely under the direction of the Minneapolis Surgical Society. Dr. Kellogg Speed, Chicago, will be the guest speaker. He will conduct a fracture clinic with demonstration of cases at the Minneapolis General Hospital; he will also lecture before medical students and the Hennepin County Medical Society.

MISSOURI

Golden Jubilee Celebration.—The St. Louis Medical Society devoted its meeting, Nov. 24, 1931, to a golden jubilee celebration in honor of its members who had practiced medicine for fifty years. The item in THE JOURNAL, Dec. 12, 1931, was erroneous in that it stated the celebration was commemorating the fiftieth anniversary of the society. The St. Louis Medical Society was organized in 1836.

Personal.—Dr. Harvey J. Howard, St. Louis, has been appointed director of the department for the prevention of blindness of the Missouri Commission for the Blind to succeed Dr. Meyer Wiener, St. Louis, resigned. Dr. Howard is professor of ophthalmology in the Washington University School of Medicine and director of the McMillan Eye and Ear Hospital and the Oscar Johnson Institute.——Dr. David J. Prather, U. S. Public Health Service, has been appointed medical director of the Tuberculosis and Health Society of St. Louis, succeeding the late Dr. Francis H. McKeon.

New Pediatric Teaching Unit.—A pediatric division with beds for forty children and eight infants was opened in St. Mary's Hospital, St. Louis, December 7. Children who have been occupying beds in the main part of the building and those in St. Mary's Infirmary were moved to the new department, which will become the pediatric teaching unit for St. Louis University School of Medicine. The rooms are arranged in wards of from two to six beds, with a number of private rooms with bath. The ward for infants has eight cribs. Patients with contagious diseases are treated in an isolation division separated from the main corridor. The service includes accommodation for free, part-pay and full-pay patients.

McAlester Memorial Foundation.—The Andrew Walker McAlester Memorial Foundation for teaching health to the public has recently been established, to function through and under the auspices of the University of Missouri, Columbia. At present the foundation is operating in a limited way through the graduate department of the Missouri State Medical Association whose members are giving health talks to the public. It is hoped to secure a $1,000,000 endowment in order that a broad plan of disseminating medical information to the public may be carried out. The curators of the university are the custodians of the endowment funds, which will be invested by them, and the income will be disbursed through the managers of the foundation. The members of the board of managers are Dr. Frank G. Nifong, Columbia, chairman of the board, and Dr. Arthur R. McComas, Sturgeon, elected from the Missouri State Medical Association; Dr. Mazyck P. Ravenel, Columbia, secretary, elected from the faculty of the medical school of the University of Missouri; Dr. John W. Connaway, Columbia, elected from the veterinary department of the College of Agriculture of the university, and Dr. George Wilse Robinson, Kansas City, elected by the Medical Alumni Association of the University of Missouri School of Medicine. Later, two members may be elected to represent the contributors. It is hoped to engage two full time public health men to go over the state teaching health and preventive medicine in schools and to nonmedical societies, and training health units and groups of teachers in the colleges. Active cooperation with the state board of health is intended. The foundation was established in honor of the late Dr. Andrew Walker McAlester, Sr., Columbia, who was professor of surgery at the University of Missouri School of Medicine, 1873-1910; dean of the department of medicine, 1880-1910, and emeritus dean and professor, 1910. Dr. McAlester, among other positions held, was first health commissioner and president of the state board of health, 1901-1905, and at one time president of the state medical association. He died, Nov. 2, 1922.

NEW JERSEY

Hospital Dedicated.—The Fitkin-Morgan Memorial Hospital in Asbury Park was dedicated, December 29. A. E. Fitkin, New York, gave $500,000 to the building of the hospital and other gifts brought the construction fund to about $1,000,000. The late L. C. de Coppet, New York broker, gave $100,000 for the nurses' home. The institution has accommodations for 150 patients. At the dedicatory ceremonies, a bronze portrait medal was presented to Dr. James F. Ackerman, who organized the project. Dr. Ackerman is a former president of the Monmouth County Medical Society.

Illegal Practitioners Prosecuted.—Hill Elmer, an itinerant "electrotherapist" who practiced in a tent on the outskirts of Salem, was convicted, Oct. 1, 1931, of practicing medicine without a license and committed to jail for thirty days. Abraham L. Fennimore, Trenton, was convicted, Oct. 9, 1931, on a second charge of practicing without a license and committed to jail for forty-five days. Charles B. Lewis, a druggist of Landisville, and Morris Natonek, who conducted a "health food store" on the boardwalk at Atlantic City, were convicted, Dec. 1, 1931, in the Atlantic City District Court, of practicing without licenses and both paid the penalty. These cases were reported by the state board of medical examiners.

Society News.—Speakers who addressed the Camden County Medical Society, January 5, were Drs. Thomas K. Lewis, on "Recent Advances in Nephritis Therapy"; Joseph C. Lovett, "Diagnosis and Treatment of Preparalytic Poliomyelitis," and Benjamin Franklin Buzby, "Orthopedic Care of Poliomyelitis."——Dr. Alvan L. Barach, New York, discussed "Developments in the Use of Oxygen Therapy" before the Hudson County Medical Society, Jersey City, January 5.——Dr. Walter Freeman, Washington, D. C., addressed the Atlantic County Medical Society, Atlantic City, January 8, on "Intracranial Aneurysms."——Dr. David Goldblatt, New York, addressed the Sussex County Medical Society, January 7, on "Treatment of Fractures of the Spine."

NEW YORK

Society News.—Dr. Arvid W. Lindau, Stockholm, Sweden, recently delivered addresses at St. Peter's Hospital, Albany, on "The Pathogenesis of Peptic Ulcer" and "Vascular Tumors of the Central Nervous System."——Dr. Frederick J. Parmenter, Buffalo, addressed the Ontario County Medical Society, Canandaigua, January 12, on "The Prostatic Problem."——Dr. James B. Collip, Montreal, addressed the Saranac Lake Medical Society, Dec. 2, 1931, on "Placental Hormone."

New York City

Fourth Harvey Lecture.—Dr. Samuel J. Crowe, Baltimore, will deliver the fourth Harvey Society Lecture, January 21, at the New York Academy of Medicine, on "Investigations on the Underlying Causes of Deafness."

Columbia Adopts Master's Degree in Graduate Medicine.—Columbia University has adopted the degree of master of science in graduate medical education for the purpose of setting a standard in preparation for the practice of medical specialties, it was announced, January 3. The degree requires not less than three years of study following graduation from a recognized medical school and the general internship. At least one calendar year of the three must be spent at Columbia. Not less than eighteen months of the time must be spent in hospitals, clinics and diagnostic laboratories of the specialty elected. Written, oral and practical examinations and a dissertation may be prescribed. The new degree is nonspecific; that is, it does not carry a designation of the specific field of study to which the student has devoted himself, according to the announcement.

Society News.—Dr. Paul Dudley White, Boston, addressed the Williamsburgh Medical Society, Dec. 14, 1931, on "Optimism in the Treatment of Cardiovascular Disease."——Dr. Harvey Cushing, Boston, addressed the neurologic section

of the New York Academy of Medicine, January 5, on "Basophilic Adenomas and Their Clinical Syndrome."——The New York Physical Therapy Society and the Harlem Medical Association held a joint meeting, January 6, with the following speakers: Drs. Heinrich F. Wolf, "Medical Diathermy"; Charles R. Brooke, "Physical Therapy in Intra-Aural and Intranasal Conditions"; Victor C. Pedersen, "Physical Therapy in Urology," and William Bierman, "Surgical Diathermy."——Dr. Hervey C. Williamson addressed the Medical Society of the County of Queens, in Forest Hills, January 8, on "Use of Obstetrical Forceps," with demonstration of newer instruments.

Annual Health Report.—The commissioner of health, in his annual report submitted to the mayor, Dec. 31, 1931, records the lowest infant death rate (56 per thousand births) and the fewest deaths from diphtheria (185) in the history of the city. Despite the severe economic depression and unusual outbreaks of influenza and poliomyelitis, the general death rate of 10.92 compared favorably with that of 10.76 in 1930 and 11.34 in 1929, the commissioner pointed out. The total number of deaths in 1931 was 77,418. There were 954 deaths from influenza in 1931, as compared with 483 in 1930; the outbreak resulted in about 2,000 deaths above the normal expectancy, however, when deaths registered under pneumonia and other causes, in which influenza played a part, were considered. During the poliomyelitis outbreak, 4,087 cases were reported to the department and there were 490 deaths. In the outbreak of 1916 there were 9,023 cases, with 2,448 deaths. The year was also marked by a high prevalence of measles, 26,516 cases having been reported; whereas in 1929 there were only 2,500 cases. Deaths from automobile accidents were more numerous than deaths from typhoid, measles, scarlet fever, diphtheria, whooping cough, cerebrospinal meningitis and deaths of mothers in childbirth combined. There were 1,302 deaths in 1931, an increase of 26 over 1930. Deaths from diabetes amounted to 1,921 as against 1,784 in 1930. Cancer increased from 8,125 in 1930 to 8,333 in 1931. The city's birth rate was 16.31, the lowest ever recorded. Among major activities of the health department during the year were the acquisition of sites for additional health centers, inauguration of a system of control of blood donors, intensification of efforts to abate smoke nuisances, and extension of antituberculosis activities.

NORTH CAROLINA

University News.—Recent lectures at Duke University School of Medicine have been given by Robert W. Hegner, Ph.D., Baltimore, on parasitology, and Dr. Eugene F. Du Bois, New York, on metabolic factors in hyperthyroidism and typhoid.

Society News.—Dr. Charles H. Mayo, Rochester, Minn., addressed the William Edgar Marshall Medical Society at Wake Forest College, Dec. 11, 1931, on "Nerve Perceptions, Especially Sight." Dr. Mayo also addressed the Raleigh Academy of Medicine, Dec. 12, 1931, on the function of the liver.——Dr. Rutherford B. H. Gradwohl, St. Louis, addressed the Buncombe County Medical Society at Asheville, Nov. 2, 1931, on "Usefulness of the Schilling Blood Method in Diagnosis and Treatment."

Pediatric Society Formed.—A group of North Carolina pediatricians at a meeting in Durham, Nov. 13, 1931, organized the North Carolina Pediatric Society. Officers elected are Drs. Yates W. Faison, Charlotte, president; Thomas M. Watson, Greenville, vice president, and Ewen K. McLean, Charlotte, secretary. Physicians who have limited their practice to the diseases of children for at least three years are eligible for membership. It was decided to hold two meetings a year, one during the annual meeting of the North Carolina State Medical Society and the other at the call of the president.

Personal.—At the request of Dr. James M. Parrott, state health officer, Dr. Mark V. Ziegler of the U. S. Public Health Service, will spend a year in Raleigh assisting the state board of health in the development of the state and county health programs.——Dr. Frederic M. Hanes, Winston-Salem, is serving as professor of medicine at Duke University School of Medicine, Durham, in the absence of Dr. Harold L. Amoss, who is spending a year as professor of medicine at Peiping University, Peiping, China.——Dr. John W. White, Wilkesboro, resigned, Oct. 1, 1931, as health officer of Wilkes County after ten years in the office.

PENNSYLVANIA

Society News.—Drs. William C. Sandy and Max Levin addressed the Dauphin County Medical Society, Harrisburg, Dec. 1, 1931, on "Progress in the State's Mental Health Program" and "Modern Psychiatry and Its Relation to General Medicine," respectively.——Dr. Temple S. Fay, Philadelphia, addressed the Harrisburg Academy of Medicine, Dec. 15, 1931, on "Intracranial Pressure Problems and Their Importance in the Field of Medicine."——Dr. John B. McMurray addressed the Washington County Medical Society, Washington, January 13, on state medicine and health insurance.——At the December meeting of the Delaware County Medical Society, in Chester, Drs. Owen J. Toland, Philadelphia, and Aaron Lovett Dewees, Ardmore, spoke on prophylactic obstetrics and technic of contraception, respectively.

Philadelphia

Personal.—At the thirty-fifth anniversary of the psychologic clinic of the University of Pennsylvania, December 11, Lightner Witmer, Ph.D., director and founder of the clinic, was presented with a volume on clinical psychology containing contributions by his colleagues and former students in many parts of the world. The volume was presented by Thomas S. Gates, president of the university.——Dr. George Alexander Knowles has been appointed assistant director of health.——Dr. John L. Redman was recently elected president of the Physicians' Motor Club of Philadelphia to succeed the late Dr. Sigmund Leon Gans.

Society News.—Dr. John B. Carnett presented the weekly postgraduate seminar of the Philadelphia County Medical Society, January 15, on "Minor Surgical Complaints."——Drs. Arthur Bruce Gill and James Torrance Rugh addressed the Philadelphia Pediatric Society, January 12, on "Spastic Paralysis in Children" and "Orthopedic Treatment of the Deformities Resulting from Infantile Paralysis," respectively.——Drs. Harry Shay, Albert B. Katz and Eugene M. Schloss, among others, addressed the Physiological Society of Philadelphia, January 11, on "Experimental Studies in the Gastric Physiology of Man: Evaluation of the Rôle of Duodenal Regurgitation in the Control of Gastric Acidity."

Curtis Clinic Dedicated.—The Curtis Clinic of Jefferson Medical College and Hospital was dedicated, Dec. 17, 1931, with ceremonies of which the principal feature was the presentation to the hospital of a portrait of Cyrus H. K. Curtis, publisher, whose gifts made possible the erection of the building. Dr. Pascal Brooke Bland, professor of obstetrics, made the presentation on behalf of the medical staff and it was accepted by Alba B. Johnson, LL.D., president of the board of trustees. The new clinic, which is the outpatient department of the hospital, was erected and equipped at a cost of $1,600,000. The building is eight stories high, with four tower floors in addition. The special departments occupy from the third to the eighth floors; the dental clinic is on the ninth and the training school for nurses occupies the tenth, eleventh and twelfth. The department of physical therapy is on the ground floor. Dr. Robert B. Nye is head of the clinic (THE JOURNAL, June 20, 1931, p. 2132).

RHODE ISLAND

Society News.—Dr. William Seaman Bainbridge, New York, addressed the Providence Medical Association, January 4, on "Millstones or Milestones in Diagnosis" and Dr. John E. Donley delivered the presidential address on "Beginnings of the Providence Medical Association."——Dr. Dennett L. Richardson, Providence, addressed the Washington County Medical Society, Westerly, January 13, on "The Medical Practice and Allied Acts in the State of Rhode Island."

Symposium on Dementia Paralytica.—A symposium on the treatment of dementia paralytica was held, January 11, at the Rhode Island State Hospital for Mental Diseases, Howard. The following physicians spoke: Drs. William A. Hinton, Boston, immunological aspects and the Hinton test; David Rothschild, Foxborough, correlated pathologic aspects; Samuel H. Epstein, Boston, chemotherapy; Rawser P. Crank, Howard, treatment with malaria, and Clifton T. Perkins, Worcester, Mass., diathermy treatment.

TEXAS

Personal.—Dr. James W. Bass, who has been acting director of public health of Dallas since June, 1931, has received a permanent appointment.——Dr. Elmer M. Howard, Pearsall, has been appointed health officer of Frio County to succeed the late Dr. Mark A. Wickware.

Instruction for South Texas Physicians.—At the semiannual session of the South Texas District Medical Society, Houston, Nov. 5-6, 1931, the South Texas Post-Graduate Assembly was organized for the purpose of sponsoring an annual clinic in Houston. Dr. Berto T. Vanzant, Houston, was elected temporary president, and plans were set in motion for the first meeting, to be held next November or December. The assembly will probably extend through five days with

section meetings and clinics each day and general meetings in the evenings. Officers elected for the South Texas District Medical Society are Drs. Henry A. Petersen, Houston, president; William P. Coyle, Orange, vice president and Jewell C. Alexander, Houston, secretary, reelected.

Society News.—Dr. William F. Starley addressed the Galveston County Medical Society, Galveston, Nov. 13, 1931, on "The Crisis in Medical Economics."——Dr. Ximie R. Hyde, Fort Worth, addressed the Hale-Floyd-Briscoe-Swisher Counties Medical Society, Plainview, Nov. 10, 1931, on "Malignancies of the Face and Neck."——Dr. Charles B. Williams, Mineral Wells, addressed the Fort Worth Eye, Ear, Nose and Throat Society, Dec. 4, 1931, on "Foreign Protein Therapy in the Treatment of Eye, Ear, Nose, Throat and Sinus Infections."——Dr. Louise O. Godley, Fort Worth, addressed the Johnson County Medical Society, Cleburne, Dec. 15, 1931, on preventive pediatrics.——Dr. Allen C. Hutcheson, Houston, was elected president of the Texas Public Health Association at its meeting in Houston, Nov. 13, 1931; the 1932 meeting will be in Dallas.——Dr. John E. Nevill, Bonham, was elected president of the North Texas District Medical Society at its meeting in Dallas, Dec. 8-9, 1931. Among the speakers were Drs. John A. Sevier, Colorado Springs, on tuberculosis, and Philip M. McNeill, Oklahoma City, on pneumonia.——Drs. Henry G. Bevil, Silsbee, and Frank J. Beyt, Port Arthur, addressed the Jefferson County Medical Society, Beaumont, Nov. 9, 1931, on "Hydroquinidine in Malaria" and "Recent Medical Treatment of Peptic Ulcer," respectively.

VIRGINIA

Health at Richmond.—Telegraphic reports to the U. S. Department of Commerce from eighty-two cities with a total population of 36 million, for the week ended January 2, indicate that the highest mortality rate (19.2) appears for Richmond and the rate for the group of cities, 12. The mortality rate for Richmond for the corresponding week of 1931 was 14.8 and for the group of cities, 13.6. The annual rate for the eighty-two cities for fifty-three weeks ended January 2 was 11.8, as against a rate of 11.9 for the corresponding period of the previous year. Caution should be used in the interpretation of weekly figures, as they fluctuate widely. The fact that some cities are hospital centers for large areas outside the city limits or that they have large Negro populations may tend to increase the death rate.

GENERAL

Consider Vitamin Standards.—A conference on vitamin standards for the U. S. Pharmacopeia was held in New York, January 8, by the Committee on Vitamin Standardization under the chairmanship of Ernest Fullerton Cook, Pharm.D., Philadelphia.

Grants for Research.—The Committee on Scientific Research of the American Medical Association invites applications for grants in aid of investigative work of interest to clinical medicine. These should be addressed to the committee at 535 North Dearborn Street, Chicago.

Society News.—The Labat Alumni Association was dissolved at its annual meeting in New York in November, 1931, and a new organization called the Postgraduate Fraternity Association of Regional Anesthesia was formed. Membership will include graduate students from schools and colleges throughout the United States. Dr. Albert M. Judd is president and Dr. Marius Greene, secretary.——The annual meeting of the Mid-West Physical Education Association will be held in Columbus, Ohio, March 30-April 2.——The annual meeting of the American Heart Association will be held, February 1, in New York.

Examination in Obstetrics and Gynecology.—The next written examination of the American Board of Obstetrics and Gynecology will be held in nineteen different cities of the United States and Canada at 2 p. m., March 26. The general, oral and clinical examination will be held in New Orleans, May 10, immediately preceding the meeting of the American Medical Association. Reduced railroad fares will be available. For detailed information and application blanks apply to the secretary, Dr. Paul Titus, 1015 Highland Building, Pittsburgh, Pa. At the meeting of the board in Chicago, Dec. 29, 1931, forty applicants for certification were examined. Of this number twenty-nine were approved, eight were conditioned and three failed.

Another Four Weeks of Automobile Fatalities.—The U. S. Department of Commerce announces that, during the four weeks ended Dec. 26, 1931, eighty-two large cities in the United States reported 768 deaths from automobile accidents as compared with 827 deaths during the four weeks ended Dec. 27, 1930. Most of these deaths were the result of accidents that occurred within the corporate limits of the city, although some accidents occurred outside the city limits. For the fifty-two week periods ended Dec. 26, 1931, and Dec. 27, 1930, the totals for the eighty-two cities were, respectively, 8,980 and 8,852, which indicate a recent rate of 25.2 per hundred thousand of population. Four cities reported no deaths from automobile accidents for the last four weeks, while three cities reported no deaths for the corresponding period of 1930.

Cooperative Clinic Tours.—Announcement has been made of the cooperative clinic tours which are being planned in connection with the centennial anniversary meeting of the British Medical Association, July 24-29, 1932. The sailing date of tour I from New York will be June 7; on the return trip this itinerary provides for the arrival in New York, August 3. Tour II will sail from New York, July 19; on the return trip this group is scheduled to arrive in New York, September 7. July 19 will also be the sailing date for tour III, and August 12 the arriving date in New York. Each physician who registers for the tour will have specific assignments made for him in each clinic city along the line of his special interest. Notices containing more complete information are appearing in current state journals.

Society of American Bacteriologists.—At the thirty-third annual meeting of the Society of American Bacteriologists in Baltimore, Dec. 28-30, 1931, Edwin B. Fred, Ph.D., professor of agricultural bacteriology, University of Wisconsin, Madison, was elected president; William Mansfield Clark, Ph.D., De Lamar professor of physiological chemistry, Johns Hopkins University School of Medicine, vice president, and James M. Sherman, Ph.D., professor of dairy industry, Cornell University, Ithaca, N. Y., secretary, reelected. The next annual meeting will be held in Ann Arbor, Mich. The program was divided into three sections: general bacteriology, medical bacteriology and agricultural and industrial bacteriology. The meeting was sponsored by the Maryland Society of Bacteriologists, of which Dr. William W. Ford, Johns Hopkins University School of Hygiene and Public Health, is president. The program included papers by Dr. Simon Flexner, New York; Arthur I. Kendall, Dr.P.H., Chicago; Dr. Adolph S. Rumreich, Washington, D. C., and Charles-Edward A. Winslow, Dr.P.H., New Haven, Conn.

Medical Bills in Congress.—Unless otherwise indicated, no action has been taken on the following bills introduced in Congress: S. J. Res. 65, by Senator Jones, Washington, to extend the provisions of the World War Veterans Act relating to hospitalization for nonservice disabilities to include any veteran who was honorably discharged from any term of service which was rendered during a war, military occupation, or military expedition, whether or not a subsequent period of service was terminated dishonorably. S. 2146, by Senator Frazier, North Dakota, to prohibit experiments on living dogs in the District of Columbia. S. 2187, by Senator Shortridge, California, to erect a veterans' hospital for women in California. S. 2188, by Senator Shortridge, California, to construct 500 additional hospital beds at the Pacific Branch of the National Soldiers' Homes, California. S. 2189, by Senator Shortridge, California, to erect a 250 bed addition to the veterans' hospital at San Fernando, Calif. S. 2718, by Senator Glenn, to erect a 520 bed addition to the veterans' hospital at North Chicago, Ill. S. 2731, by Senator Brookhart, Iowa, to erect a 300 bed addition to the veterans' hospital at Knoxville, Iowa. H. R. 5833, by Representative Rankin, Mississippi, to establish a permanent medical service in the Veterans' Administration. H. R. 5859, by Representative Dyer, Missouri, to amend the National Prohibition Act, as supplemented, to provide that nothing in the act shall prohibit or limit "the professional privilege of graduated licensed physicians from exercising their scientific judgment in prescribing alcoholic beverages for medicinal purposes." H. R. 6042, by Delegate Houston, Hawaii, to establish a branch home of the National Home for Disabled Volunteer Soldiers in the Territory of Hawaii. H. R. 6160, by Representative Fulmer, South Carolina, to authorize the Administrator of Veterans' Affairs to hospitalize ex-service men of the World War in any private hospital when sufficient facilities are not available in "regular veterans' hospitals." H. R. 6396, by Representative Johnson, South Dakota, to grant equality in domiciliary care to retired enlisted men of the Army, Navy, Marine Corps, Coast Guard and enlisted men transferred to the Fleet Naval and Marine Corps Reserve. H. R. 6594, by Representative Ludlow, Indiana, to erect a 150 bed addition to the veterans' hospital at Indianapolis. H. R. 6658, by Representative Martin, Oregon, to create a Bureau of Welfare of the Blind in the Department of Labor. H. R. 7183, by Repre-

sentative Harlan, Ohio, to provide that certain veterans not honorably discharged shall be admitted to "Veterans' Administration homes." H. R. 7186, by Representative Johnson, Washington, to erect a 300 bed addition to the veterans' hospital at American Lake, Wash. H. R. 7190, by Representative Hooper, Michigan, to erect a 362 bed addition to the veterans' hospital at Camp Custer, Michigan.

LATIN AMERICA

Government Welfare Fund.—The provisional government of Brazil has established a fund with which to help finance such private social welfare organizations as hospitals, crèches, sanatoriums, child-welfare centers, homes for the poor and the aged, dispensaries and orphan asylums. With the establishment of this fund, the subsidies which the federal government grants to such institutions will be regulated and apportioned more equitably and efficiently, according to the *Bulletin* of the Pan American Union. The money is to be obtained from the proceeds of certain customs duties, especially the tax on alcoholic beverages; federal appropriations and donations from private individuals. The ministry of justice and the interior will administer the fund in accordance with presidential decrees. It has been provided that no institution shall receive a subsidy of more than 200 contos annually.

PORTO RICO

Medical Association of Porto Rico.—The twenty-eighth annual meeting of the Medical Association of Porto Rico was held, Dec. 18-20, 1931, in Santurce, under the presidency of Dr. Manuel Diaz-Garcia. Clinics were held on tropical diseases at the school of tropical medicine of the University of Porto Rico; on immunology of asthma at the Mimiya Clinic; on modern treatment of tuberculosis at the sanatorium in Rio Piedras, and on fractures at the Diaz-Garcia Clinic, Santurce. Among speakers on the scientific program were Drs. Esteban Garcia Cabrera, Jr., on persistent genito-urinary infections; Walter C. Earle and Anthony Arbona, malaria in Porto Rico; W. B. Castle, Boston, treatment of sprue; Cornelius R. Rhoads, New York, treatment of secondary anemia, and Oscar G. Costa-Mandry, syphilis in Porto Rico. Dr. Rafael Bernabe, San Juan, was elected president and Dr. Pablo Morales y Otero, San Juan, secretary.

FOREIGN

Personal.—Dr. Fernand Lemaitre of St. Louis Hospital, Paris, has been elected professor of otolaryngology in the Faculty of Medicine of the University of Paris to succeed Dr. Pierre Sebileau, who retired October 1. Dr. Lemaitre is one of the editors of the *Annales d'oto-laryngologie.*——Dr. A. Murray Drennan, professor of pathology in Queen's University, Belfast, has been appointed professor of pathology in the University of Edinburgh.——Henry S. Wellcome, chemist and pharmacist of London, was knighted by King George V, on New Year's Eve, in recognition of his support of medical research, according to the New York *Times.* Wellcome was born in the United States and was naturalized in England during the World War. He is the founder of the Wellcome Historical Medical Museum and the Wellcome Bureau of Scientific Research, London; the Wellcome Research Laboratories, Khartoum, Africa, and the Floating Research Laboratory on the Nile River, Egypt.

International Congress of Physiology.—The fourteenth International Congress of Physiology will be held in Rome, August 29-September 3, at the Royal University of Rome. Members who expect to present papers must send abstracts in one of the official languages (English, French, German, Italian) to the president of the congress, Prof. Filippo Bottazzi, R. Istituto di Fisiologia, S. Andrea delle Dame, 21, Naples, during the month of May. Those desiring to give demonstrations are requested to specify, not later than May, what animals, apparatus and chemical substances are needed. Special scientific apparatus will be furnished if applied for during April. The membership fee is 100 lire and must be sent in advance to the president of the congress.

Memorials to Sir James Mackenzie.—Two memorials have recently been dedicated in honor of Sir James Mackenzie, a plaque marking his house in Burnley, England, and a bust of him in a park near his home. Under the bust is the inscription: "Sir James Mackenzie, M.D., LL.D., F.R.S., F.R.C.P., 1853-1925, who achieved fame by his researches in connection with diseases of the heart and was from 1879 to 1907 a general practitioner in Burnley." Lord Moynihan, who originally suggested the memorials, presided at the ceremony of dedication.

Foreign Letters

LONDON

(From Our Regular Correspondent)

Dec. 12, 1931.

Research on Asthma

A further report of progress of the Asthma Research Council from June, 1930, to October, 1931, has been issued. At the Asthma Clinic of Guy's Hospital, more than 300 patients have attended, and their cases have been thoroughly investigated. Particular attention has been paid to the respiratory tract, which has been studied clinically and by bacteriologic and biochemical examination of the sputum, by roentgen examination of the chest and nasal cavities, and by expert examination of the nose and pharynx. The "urinary proteose," mentioned in previous reports, still forms the main preoccupation of the clinic. It has been shown that during the asthmatic paroxysm profound changes occur in the blood and urine and that an albuminous substance is excreted in the latter in relatively large amounts. The presence of this substance has now been confirmed by other workers and our knowledge of its chemistry advanced. An asthmatic person is highly sensitive to his own proteose, and injection of it may produce a paroxysm. It probably contains the albuminous complex to which the patient is sensitive and also a protective substance elaborated against it by the organism. In hay fever a similar or identical proteose is excreted, and the proteose obtained from one can be used in the diagnosis and treatment of another. All asthmatic patients excrete a proteose during a paroxysm, but it is unusual for one asthmatic person to react to another's proteose. Nevertheless, in cases of specific sensitization, such as horse asthma, the proteose is similar if the sensitization is the same, so that one case of horse asthma will react to the proteose from another case. By further study it is hoped to analyze the mechanism of the asthmatic paroxysms and to understand the more complex forms of the disease. While large doses of proteose induce an attack of asthma, small doses often seem to desensitize the patient and free him from his malady. This treatment has given satisfactory results in some instances, but it remains empirical, and more information is necessary before its ultimate value and the dosage and best methods of preparing the proteose can be ascertained.

The other main line of research is the bacteriology of the sputum. A large number of asthmatic sputums contain an organism that has the peculiar property of forming histamine, both in the bronchial secretions and in vitro on culture mediums. Histamine may play a dominant part in the asthmatic paroxysm, as it powerfully contracts the bronchial tubes. It seems doubtful whether these bacteria can induce asthma by the local formation of histamine in the lungs, but the problem is being studied. In any event the frequency of these bacteria and the good results sometimes obtained with vaccines made from them make further investigation desirable as to their nature, seasonal variation and predilection for the nasal sinuses and chest of the asthmatic patient. For children, dextrose and general hygienic treatment are used. When these fail, open air treatment is advised, as every effort should be made to arrest asthma in its initial stage, and cure should be the aim rather than palliation. A brief visit to a convalescent home is found useless. In order to break the habit, the child must remain many months in an environment in which he does not get asthma. Both in children and in adults respiratory exercises have proved a valuable adjuvant, but they rarely cure alone.

The research and routine work of the clinic is being carried out, under the supervision of Dr. A. F. Hurst, senior physician to Guy's Hospital, by the following staff: P. J. Briggs, radiologist, E. T. Conybeare, physiologist, C. Gill-Carey, otorhinolo-

gist, A. F. Knott, clinical pathologist, G. H. Oriel, biochemist, and L. J. Witts, physician. Copies of the report may be obtained gratis from the secretary, Asthma Research Council, King's College, Strand, London, W. C. 2.

Medical Manifestations of the Financial Situation

One of the national problems is the restoration of the value of the pound in international exchange. Its fall in value is attributed to excessive importing as compared with exporting. The government has attempted to remedy this by abandoning our traditional system of free trade and imposing a tariff on certain imports. It is naturally thought that the buying of British instead of foreign articles, whenever possible, would be beneficial. In the medical sphere the new policy is in evidence. A leading medical journal points out that British potassium bromide is retailed for exactly the same price as German and asks why the latter should be imported when we could give more employment at home and without any loss by excluding it. The economic fallacies that underlie protection are, as usual, ignored. The assumption that if the German bromide should be excluded or only taxed the British would still remain the same price is by no means justified. Manufacturers who demand protection always talk about giving more employment but never say anything about the raising of price, which is usually their object. Again, our contemporary overlooks the irrefutable free trade doctrine that imports may not be diminished without a corresponding diminution of exports. Thus, more employment is not created but industry is turned from natural into artificial channels, which are less efficient.

Another manifestation of the financial disturbance is the injunction not to send patients to foreign health resorts. A meeting of physicians has been held in London, under the presidency of Dr. W. G. Willoughby, president of the British Medical Association, to receive a medical statement on winter health resorts on the British coasts. It was pointed out that British seaside resorts in the south and west have equable, sheltered climates and that, in consequence of the Gulf Stream, they enjoy a climate 20 degrees warmer than is proper to their latitude. From November to March their average temperature is 45 F. compared with 24 in the Alps and 49 at Nice, and their daily range of temperature is only from 8 to 10 degrees, about half that of the foreign resorts mentioned. Compared with the Riviera, the days in England are a little cooler but the nights are considerably warmer. A dry atmosphere with cold in the Alps or heat in the desert (at Assouan) is sometimes of definite medical value, but the more humid British winter resorts, with great equability of temperature, are highly favorable to the preservation and restoration of health. A committee of leading physicians was appointed to further the objects of the meeting. No doubt these eminent men would be surprised to hear that in spite of the correctness of their meteorology and the patriotism of their motives, their efforts to benefit their country are not economically sound. When patients go abroad, their payments for services received have ultimately to be made from this country, and the only way in which they can be made is by export of British goods or the (much less likely) giving of services. The foolish statement was made the other day in a medical journal, and uncontradicted, that invalids going abroad take money out of the country—a mistake which had some semblance of truth when we had a gold currency. One thing that cannot be expected from educated persons is an elementary knowledge of economics, and the absence of such knowledge prevents them from pronouncing on economic questions.

Overpopulation and Differential Fertility

Sir Arthur Thomson, the zoologist, lectured to the summer school of the British Social Hygiene Council on the biologic basis of human progress. He thought that the first great hindrance to progress was that the world was becoming too full. Its total increase of population was not less than 12 million every year. The second difficulty was differential fertility. The most desirable persons were multiplying most slowly. Taking 1,000 married men of the age of 55 in the upper and upper middle classes, the rate of multiplication was represented by 119, while that for skilled workmen was 153 and for unskilled 213. Thirdly, natural selection was gone and no good substitute had been found for it. Because man had formed a society and was a creature of reason he had evaded natural selection. What he should have done was to adopt methods of rational social selection, so that the superior would get the benefits of their superiority. Anything that tended to make it inferior as well as superior was working against progress. Finally, we now had a low standard of positive health and our old enthusiasm for physical fitness was not being maintained in this generation.

Action for Breaking of Hypodermic Needle Fails

The difficult problem presented to the London and Counties Medical Protection Society by the attempts to make physicians responsible for the breaking of hypodermic needles during injection has been described in THE JOURNAL (Nov. 21, 1931, p. 1549). It was stated that so far no case had been taken into court, though damages had been paid in some instances by arrangement. The society has just successfully defended its first case in court, which is of great importance to the medical profession as the judge held that a physician cannot be made liable for the breaking of a needle unless negligence is proved. A woman suffering from disseminated sclerosis was treated by intramuscular injections of sulpharsphenamine into the buttock. At the thirty-fifth injection the needle broke. The physician immediately made a small incision under local anesthesia and endeavored to remove the fragment but failed. On the same evening he made a larger incision under general anesthesia but again failed. The next day and two days later, roentgenograms were taken and further probing was done under local anesthesia, but in vain. It was alleged that the injection had been given in a hurry and carelessly, that the physician must have used a defective needle or struck the bone, and that he was negligent in failing to remove the fragment. The defendant denied hurry and said that when the patient's muscle was bunched up for the injection there was a muscular twitch which broke the needle. The needle used was a proper one. The judge held that "the mere fact of the needle breaking is not necessarily negligence; it might have been a defective needle; it might have been broken by some movement of the patient; it might have been broken because the defendant carelessly and clumsily reached the bone. But this last possibility was not proved and could not outweigh the other two possibilities." The judge thought that the defendant's evidence probably excluded the possibility of his being found negligent. The jury gave a verdict for the defendant.

PARIS

(From Our Regular Correspondent)

Dec. 2, 1931.

Epidemics in France in 1930

Every year the Academy of Medicine designates one of its members to present a general report on the course of epidemics in France during the previous year. Such a report constitutes an epitome of the information that the health officers of the various departments are required to furnish. This report, after being read and commented on publicly at a regular session, is sent to the minister of public health, who usually files it away with its predecessors, where it continues to collect the dust of official documents. There is no case on record in which the minister has ever decided to satisfy the needs mentioned in

the reports. Dr. Lesné, who was delegated for the task this year, pointed out, like all his predecessors, the inadequacy and inaccuracy of the information furnished to the academy by the various municipal authorities. The notification of cases of epidemic disease emanates often from nurses, policemen, or even from hotel keepers, instead of from physicians. Too many physicians escape this legal requirement, in order not to violate the right of privileged communication or to incur the displeasure of their clients; for a notification made by a physician is the signal for dispatching a crew of municipal fumigators, who apply their disinfectants, without much discretion, to the apartment.

The absence of the official notification on the part of the physician does not prevent him from advising the family to have such fumigation performed by private parties who will take more care. The result is that statistics based on the official notifications are inaccurate; that is, they fall short of the truth, at least as far as the wealthy class is concerned, and particularly as regards measles and scarlet fever. Typhoid, diphtheria and poliomyelitis are treated with more circumspection. Having made these reservations, Dr. Lesné reports that, of the two diseases typhoid and diphtheria, the first is manifestly declining, while the second continues to increase in morbidity and gravity, in spite of the attention being given to vaccination. As in other countries, diphtheria is becoming a disease more and more to be feared, either because the causative agent is increasing in virulence or because it is found more frequently associated with the streptococcus, which often makes illusory the use of antidiphtheritic serum, if used alone. In 1929, 20,400 cases of diphtheria were notified in France, and in 1930, 23,700 cases. From England it is reported that, during the same period, the number of cases increased one third, while in Germany the morbidity doubled during the corresponding period. Dr. Lesné concludes that, under these conditions, in spite of the fact that preventive vaccination has become more widespread and is more generally accepted by the people, it is desirable that vaccination against diphtheria be made compulsory. Poliomyelitis constituted the gravest factor in the epidemiology of 1930, owing to the epidemic that was prevalent in the Bas-Rhin region, from June until the end of September. There were 400 cases notified, or 60.5 per hundred thousand of population, while many obscure or atypical forms remained unknown. The epidemic reached its height in the month of July (220 cases). By the end of September the epidemic had died out. Of the 561 communes composing the department of Bas-Rhin, 125 were affected, but there were only twenty-nine communes in which the disease assumed epidemic proportions. The percentage of morbidity for the total number of communes attacked was 108.6 per hundred thousand of population. Eighty-four per cent of the cases were observed during the preschool age. The case mortality was 10 per cent. The number of deaths, increasing with the age of the patients, reached 20 per cent in adults. Whenever it was possible to make an extensive inquiry, the possibility of a transmission of the virus through interhuman contact could be proved. In no case was there indisputable evidence in support of the theory of the propagation of the disease through the drinking water or the food. The epidemic reached regions adjacent to the department primarily attacked (Moselle, 80 cases; Haut Rhin, 58 cases; Meurthe-et-Moselle, 35 cases; Ardennes, 44 cases; Saône-et-Loire, 13 cases; Aisne, 16 cases). Bourgogne and Vosges, although near, were not affected at all. There were a few cases in departments much farther away, no doubt owing to the transportation of patients already in a latent state of incubation (Maine-et-Loire, 121 cases; Calvados, 26 cases). There were 70 sporadic cases observed in the department of the Seine and at Paris, as compared with 12 cases in 1929. In 1930 a total of 1,530 cases of poliomyelitis were notified in France, 1,041 of which belonged to the third quarter. During the same period, a similar seasonal recrudescence was observed in many foreign countries. The other epidemic diseases presented no peculiar aspects. Measles showed a recrudescence throughout the whole country but was everywhere benign. Scarlet fever was stationary (14,000 cases). Cerebrospinal meningitis showed a decrease (412 cases); also typhoid and the paratyphoids. Undulant fever increased slightly. From the department of Alpes-Maritimes, 21 cases of infantile kala-azar were notified.

The Abuse of Radio Medical Lectures

The medical profession is beginning to feel some anxiety over the abuse by certain wireless stations of medical lectures broadcast to the public. At the start, the information consisted only of useful and discreet advice given, during epidemic outbreaks, to indicate measures of preservation, point out the dangers of contagion and recommend disinfection. Later, the lecturers offered their services in campaigns against tuberculosis, syphilis, alcoholism, and for the propaganda in favor of the B C G vaccine, antidiphtheritic vaccination and mental prophylaxis. Finally, veritable clinical lectures on most of the diseases were transmitted to the public in this manner. Soon the dangers of the system began to manifest themselves. A few months ago, medical lectures were transmitted on homeopathy, and in terms so aggressive toward other physicians that, at the request of influential medical authorities, the minister ordered the lectures discontinued. In these lectures the public was warned against diphtheritic serum, and the statement was made that homeopathy was able to cure diphtheria by its own remedies. Another station transmitted lectures on diseases of the respiratory tracts, and, almost simultaneously, still another station warned the auditors against the affirmations of the other lecturers. This polemical controversy had a deplorable effect, tending to lessen the confidence of the public in the medical profession, especially since the public comprised not only healthy persons but also patients in hospitals and sanatoriums who, from their beds, heard the value of the treatments they were receiving discussed. The medical press has contained several protests and demands that this type of lecture be suppressed or at least subjected to control.

BERLIN

(From Our Regular Correspondent)

Nov. 30, 1931.

Congress of Internal Medicine

The Deutsche Gesellschaft für innere Medizin will hold its fourteenth session in Wiesbaden, April 11-14, under the chairmanship of Professor Morawitz of Leipzig. As the creation of the Congress of Internal Medicine dates back to April 20, 1882, some simple ceremonies will be held on the evening of April 10 in commemoration of the fiftieth anniversary of the founding of the society. The scientific program of the congress comprises (thus far) the following papers and addresses: Monday, April 11 (joint meeting with the Deutsche pharmakologische Gesellschaft), speakers, Dale (London) and Volhard (Frankfort-on-Main); Tuesday, April 12, Brauer (Hamburg), "Disturbances of the Pulmonary Function"; Liebermeiste (Düren), "Bilateral Pneumothorax"; Jacobäus (Stockholm), "Pneumothorax"; Wednesday, April 13, "Diseases of the Stone-Free Biliary Tracts," Umber (Berlin), Schmieden (Frankfort-on-Main), Aschoff (Freiburg); Westphal (Hanover), requested to deliver an address on the subject. Announcements of addresses with manuscripts should be in the hands of the chairman, Professor Morawitz (Leipzig, Johannesallee 32), not later than February 5, as the number that can be accepted is limited to sixty.

Research on the Male Sex Hormone

The testis hormone, or the male sex hormone, has been isolated in crystallized form by Dr. Adolf Butenandt, privat-

dozent in Göttingen, who reported in Hamburg, October 23, before a small gathering, on the chemical investigations on the testicular hormone. The results of his research were published in the *Zeitschrift für angewandte Chemie*, November 16. As in the case of the follicle hormone, the crude oil was supplied by the Chemische Fabrik Schering-Kahlbaum. The oil had been derived from the urine of men in accordance with a technical process that Professor Schoeller and Privatdozent Dr. Gehrke elaborated in the research laboratory of this company. From this crude oil Butenandt succeeded in obtaining 15 mg. of a crystallized substance, which, in view of the application of the great caution that the isolation of a physiologically highly active substance requires, may be regarded as the male sex hormone and combines the potency of 25,000 liters of urine of males. Butenandt succeeded, furthermore, in his study on this 15 mg. of crystallized substance, in penetrating so far into the chemical structure of the highly active substance that a comparison was possible with the chemistry of the follicle hormone; that is to say, a comparison of the structure of the male hormone with that of the female hormone. The two hormones show a far-reaching similarity in their composition but also sharply demarcated differences. The male substance, chemically, is a "saturated" compound, whereas the female substance is "unsaturated"; the male substance is neutral, whereas the female substance is acid.

Retrenchment in the Public Health Service

The retrenchment in the public health service necessitated by the general economic conditions requires just as much care as reorganization upward. In order to prevent the health work that has been developed during recent decades (for the most part, as a result of voluntary action) from being disturbed in its foundations and a later upward movement from being made unnecessarily difficult by purely arbitrary reduction of the tasks proposed, the federal minister of the interior has requested the federal sociohygienic leagues in whose hands lie the most important branches of the public health service to prepare an emergency program in keeping with the previous performances and the special needs of the various fields of labor. This will provide the administrations with the necessary material on which to base their conclusions. These proposals have now been published in a comprehensive memorial and have been thus made available for any one interested. For instance, the German society for combating venereal disease called a conference of experts to consider what economies might be introduced in connection with the combating of venereal disease. As a result of the deliberations, criteria as to how physicians can best reduce the cost of treatment of venereal disease have been published. Among other recommendations, the formation of mergers through the union of all parties interested (communes, insurance carriers, physicians and welfare workers) is suggested, in order that duplicated expenditures may be avoided.

How the economic situation is already affecting public health was shown by a resolution of the Berlin Aerztekammer, November 21, in papers presented by competent writers. It was brought out that the economic depression with the unemployment of large masses of people constitutes a serious menace to the health of the nation. Already, mental and nervous disturbances are observable, with consequent impairment of earning power and increased predisposition to bodily ailments. The economic and psychic distress of the parents will necessarily affect the children in a serious way; for their more sensitive constitution is much more exposed to all injuries, and the effects on them are more lasting. In the case of juveniles, the lack of regular employment often entails unfavorable psychic development. The suggestion was therefore made that only dispensable or less important services be curtailed and that the services directly affecting the life and health of juveniles be preserved unimpaired, and, where needed, be still further developed. Every endeavor must be made to preserve sickness aid as the important manifestation of health insurance, and also the other forms of aid of the remaining social agencies. The resolution demands the abolition of the limitations imposed by the emergency decree, which prevents or makes more difficult for the insured and their families the securing of prompt medical aid and the carrying out of medical prescriptions; the assurance of adequate food for the unemployed and particularly their children; moderate prices for all important necessaries of life, and, especially, food products; measures for the improvement of housing conditions; continuation of the crusade against alcoholism and the abuse of smoking, and, finally, the development and encouragement of all agencies of physical recreation and mental uplift.

ITALY

(From Our Regular Correspondent)

Nov. 16, 1931.

Congress of the Sciences

The Società italiana per il progresso delle scienze held its annual congress recently in Milan, and comprised a medical section and a biologic section. In the medical section, Prof. Baldo Rossi, senator and clinical surgeon of Milan, dealt with surgical anesthesia, calling attention to studies carried out in his clinic on gas anesthesia and to the better apparatus now available. He presented also apparatus for the administration of nitrous oxide and of ethylene, and expressed the conviction, after a personal experience of nearly two years, that anesthesia with gases, and particularly with the two mentioned, may be considered the method of choice for general anesthesia. Professor Fasiani of the University of Padua took part in the general discussion.

Prof. Gaetano Fichera of the University of Pavia spoke on "Recent information and new data of the researches on histogenetic chemotherapy as applied to malignant tumors. The speaker recalled his previous communications on the subject presented at the congresses of Bolzano, Trent and Bologna. He discussed numerous cases subjected to histogenetic corrective chemotherapy, and described the method of preparation, the norms for its administration, the mechanism and the contraindications.

In the section on biologic sciences, Prof. Nicola Pende, clinician at the University of Genoa, presented a paper on the neurochemistry of the aged and on the physiopathology of senility. According to biologists who have studied the multiplication of isolated and collective tissues, senility and death are due not to an inevitable intrinsic diminution of the vital energy of every tissue, after a number of years, but to a progressive alteration, through the effects of life itself, of the humors in which the living tissues are immersed. If the humors are renewed, the cells take on again their productive, reproductive and vegetative energy. The connective tissue, heretofore regarded solely as a supporting structure of the more differentiated organs of the body, is that which forms and maintains the chemical agent that bathes all the cells, fixes and destroys the foreign elements that penetrate the organism, and repairs the losses and partial destructions of the tissues. It is therefore necessary, before the connective tissue reaches a state of fibrous degeneration, to stimulate its vitality, to restore it and to liberate it from its acidosis. These are the modern means on which the hopes of retarding the involution process are based. Researches that Professor Pende has carried out in this direction show that such an ideal is not unattainable if one can successfully combat by means of suitable lavages the senile acidosis and can stimulate the vitality of the connective tissue. Professors Migliavacca and Marinuzzi participated in the general discussion.

Professor Silvestrini presented a paper on "Various Forms and the Varying Pathogenicity of the Tuberculous Virus."

Professors Belfanti and Contardi offered a communication on the modern conceptions concerning beriberi, indicating that the disease is due to an insufficiency of certain special enzymes.

Professor Artom of the University of Pavia spoke on genetics.

The Death of Professor Dionisi

Prof. Antonio Dionisi, professor of pathologic anatomy in the University of Rome, died suddenly at Salice Vighera, while he was delivering the opening address of the congress on rheumatism. Born in the province of Teramo (Abruzzi) in 1866, Professor Dionisi graduated in medicine at Rome in 1890. After a brief period as assistant in pathology at Florence, he became an aid in the Istituto di anatomia patologica in Rome, which was under the directorship of Professor Marchiafava. Appointed to a chair at the University of Modena in 1904, he passed thence to Palermo and later to Rome, where, in 1922, he became the successor of his teacher. The researches of Professor Dionisi were directed chiefly toward the etiology of malaria. At first (1889-1890) he studied the behavior of the elements occurring in the blood during malarial fever in man, whether spontaneous or provoked, and aided in establishing the difference in the behavior of the parasites of quartan, benign tertian and estivo-autumnal fevers, not only as to the production of malarial anemia but also as to reconstitution of the blood. These results served as evidence for the specificity of the parasites of the malarial fevers. In collaboration with Bignami he studied the postmalarial anemias. In a second series of researches, he supported the theory that malaria in man is transmitted by a hematophagous insect. While studying in the Ager Romanus the life cycle of malarial parasites, he discovered three species of parasites that produce malaria in pipistrels (bat of the genus Pipistrellus), and showed that they have no connection with malaria in man. Great interest attached to his experimental attempts to transmit the Halteridium of pigeons to Culex pipiens (1898). In 1899-1900 he studied systematically on monkeys (Macacus rhesus) infected with malaria the parasites found in patients suffering from recurrences in the months that precede the outbreak of new infections and showed that no connection exists between estivo-autumnal infections and the finding of gametes corresponding to the preepidemic period. In another series of researches he dealt with the pathology of the blood and of the lymphatic apparatus; then there were anatomic researches on bronchopulmonitis verminosa in cattle, on the pathologic anatomy of leishmaniosis, and on the pathogenic classification of icterus. He collaborated in the treatment of infectious diseases in man and in animals, publishing monographs on malaria, acute anterior poliomyelitis and leishmaniosis. At the request of the *comando supremo* of the Italian army, he compiled, during the war, the regulations for the prophylaxis and the treatment of malaria. He volunteered for war service and was placed in charge of the antimalarial prophylaxis service of the third army corps. He was a member of the principal Italian medical academies and of the Accademia dei lincei.

Meeting of Pediatricians

The Ligurian chapter of the Società di pediatria met recently in the Clinica pediatrica of Genoa, under the chairmanship of the clinician Professor Pacchioni. Professor Caffarena spoke on the differential diagnosis of rubeola and fifth disease, or erythema infectiosum. He regards as pathognomonic for rubeola involvement of the peripheral lymphatic system, whereas for fifth disease the decisive diagnostic factor is supplied by the morphology of the erythema and by the manifested polychromatism.

Professor Guassardo spoke on the etiopathogenesis of acute anterior poliomyelitis. He holds that, in the determination of poliomyelitic paralysis, in addition to the presence of the virus in the blood, there is a deficient protective functioning of the hemato-encephalic barrier, which is connected with an altered capillary permeability. Causes of various kinds (hormonal, neurovegetative, physical and chemical) capable of modifying the capillary permeability may provoke, by facilitating the passage of the virus from the blood to the electively receptive nerve cell, the evolution of poliomyelitic paralysis. In view of these considerations, the speaker holds that one should proceed cautiously in those interventions that may influence the permeability of the meninges.

Professor Guassardo and Dr. Ghis discussed the actinic influences brought to bear on the Klebs-Löffler bacillus with relation to the frequency of the irradiation wave. On the basis of results secured by them by subjecting various strains of diphtheria bacillus to irradiations of varying wavelength (ultraviolet, red and infra-red rays), they hold that the actinic action exerts an effective influence on the structure of the bacterial protoplasm. Such influence affects some of its chief biologic manifestations (morphologic and staining qualities, pathogenic potency, and the like). The effects vary in character according to the wavelength of the irradiations.

Professor Gismondi reported a rare case of congenital micrognathia. This malformation of the mandible is still little known in the pediatric field. He compared the condition with the other few cases reported in the literature, and explained the anatomic and clinical peculiarities. He emphasized particularly the difficult respiration and the disadvantages affecting alimentation. The orthopedic treatment consists of an apparatus designed to bring forward the mandible and prevent the dropping back of the tongue.

Dr. Tamburri of the Istituto biotipologico ortogenetico reported the results of anthropometric researches carried out in the institute on Genoa children aged 7 to 12, during the school year. The speaker emphasized the need of preparing regional tables pertaining to the development of children, since the biotype varies in different regions. The development of the Ligurian child is rather backward up to the ages 9-10. The sexual development is earlier in the females than in the males, and the cases of hypersomia are more frequent in the former. Between the ages 4 and 7 there occur certain neurovegetative changes similar to the changes of the pubertal period. From that age on, it is possible to divide the subjects into two classes: an asthenic-atonic group and a sthenic-hypertonic group.

Professor Bosio of Alexandria described some cases of purpura hemorrhagica with special anaphylactic manifestations, consisting of angioneurotic edemas and hemorrhages of the stomach and the intestine.

Roentgenotherapy in Inflammatory Disorders

Professor Milani of Perugia spoke at the third International Congress of Radiology on "Roentgenotherapy in Inflammatory Disorders." The speaker stated that the treatment of areas of inflammation with roentgen rays became, in 1924, through the work of Heidenhain and Fried, a recognized therapeutic method. The technic consists in the early direct irradiation of the focus. The majority of authors advise irradiation with small doses, the optimum being placed at 20 per cent of the erythema dose. An attempt has also been made to influence at a distance an inflammatory lesion with irradiations of the spleen and of the epiphyses of the bones. The greatest advantage of direct roentgenotherapy is derived in localized, acute or subacute, types of inflammation; the chronic infections, and especially the specific types (tuberculosis, syphilis, actinomycosis) give less rapid and less brilliant results. Many trials have been made of indirect roentgenotherapy in malaria, but according to the Italian authors the results have not been very effective. The treatment of pulmonary tuberculosis by means of irradiations of the spleen has not yielded satisfactory results. According to Milani, in typhoid and parathyroid, irradiation with small

doses of the epiphyses of the bones cannot be considered as a curative method; but the reaction of the typhoid patient to this treatment may be regarded as a good therapeutic criterion, and sometimes an improvement in the general condition and a shortening of the febrile period are observed.

Four factors may be invoked to explain the action of the local irradiation, namely: modifications of the circulation; action of cellular necrobiosis and absorption of protein; action on phagocytosis, and action on the reticulo-endothelium.

Priority as to Suturing of the Heart

Dr. Guido Farina of Albano Laziale (near Rome), in a polemic discussion of the subject, claims priority in the suturing of the human heart. On Jan. 8, 1896, being at that time surgical assistant in the Ospedale della consolazione in Rome, Farina performed such an operation. The patient died on the seventh day from double bronchopneumonia. Necropsy revealed that the incised wound of the right ventricle had penetrated the cardiac cavity and that the cicatrization of the surgical suture was perfect. The history of the case was promptly reported by Professor Durante (Farina's teacher) to a congress of surgeons, which was in session in Rome, and is also confirmed in an article published by Professor Durante. A few months later, Professor Parrozzani, likewise a pupil of Durante, performed a similar operation, which was followed by the recovery of the patient.

TURKEY

(From Our Regular Correspondent)

Ankara, Nov. 24, 1931.

Immigration and the Public Health Law

Immigrants came *en masse* to Turkey from the Balkans and from the Caucasus at the close of the Turkish-Russian war in 1878 and at the close of the Balkan war in 1912; after the recent armistice, about 10,000 White Russians fleeing before the Red Army poured into Istanbul. The statistical yearbook (volume 3, 1930) shows that the number of immigrants admitted during the last decade comprised 242,001 men and 235,957 women, a grand total of 477,958. The greatest influx occurred during the three years following the Lausanne treaty, according to which the Greek population of Turkey and the Turkish population of Greece and Macedonia were to be exchanged. Small groups of immigrants arriving during recent years have come mostly from Yugoslavia, Rumania and Bulgaria. While before the World War the number of emigrants was almost negligible, the number of postwar emigrants has been estimated at more than 800,000. This situation necessitated the incorporation in the public health law of provisions regarding immigration and emigration. Accordingly, persons of foreign nationality arriving *en masse* or in small groups to settle in Turkey, or refugees renouncing their nationality and desiring to become Turkish subjects, may enter the country only at certain frontiers or ports decided on jointly by the ministry of health and social assistance and the ministry of the interior. Self-supporting foreigners and their families who come to live in Turkey for not more than three months, or who live in Turkey permanently, or who come with the intention of making Turkey their permanent home by becoming Turkish subjects, are permitted to enter the country anywhere. Entrance into the country is refused to persons suffering from cholera, bubonic or pneumonic plague, food poisoning, smallpox, diphtheria, cerebrospinal meningitis, encephalitis, dysentery, amebic dysentery, puerperal fever, glanders, scarlet fever, anthrax, poliomyelitis, measles, leprosy, recurrent fever, undulant fever, venereal disease, trachoma, typhus fever, typhoid, paratyphoid, or any other disease indicated by the ministry of health; typhoid carriers are also banned. Mental defectives and prostitutes are not permitted to enter. Possible changes in regard to the aforementioned restrictions and the precautions to be taken in connection with the method of transport and supervision until arrival at the final destination of refugees and immigrants of foreign nationality desiring to settle in Turkey are decided on jointly by the ministry of health and the ministry of the interior. Vessels or railroad companies bringing persons suffering from any of the aforementioned diseases are required to take back such persons to the place of departure or to transport them to a locality indicated by the health officer, where such persons may be isolated and provided with medical care. Expenses incurred by such operations are to be borne by the respective administrations. Captains of vessels from foreign countries are required to furnish the coast health officer inspecting the vessel with a list containing the names of passengers and crew intending to go on shore and of all persons disembarking in Turkey; if there are any sick persons among them, the ship's surgeon is required to enter the diagnosis or give information relative to the disease suspected. Turkish or foreign vessels transporting emigrants or refugees *en masse* or in small groups must be provided with a qualified ship's surgeon and first aid emergency medical supplies. All parts of the vessel and in particular the quarters reserved for refugees or emigrants must be in good hygienic condition and afford protection against a rough sea.

Preparation of B C G Vaccine in Government Laboratory

As an outcome of last year's national tuberculosis congress and on the recommendation of the president of the society for the prevention of tuberculosis, Prof. Dr. Tevfik Salim Pasha is advocating the nation wide use of B C G vaccine; it is now being prepared at the laboratory of the Ankara Institute of Hygiene by a specialist who has studied its preparation under Calmette in Paris. A circular was recently issued by the ministry of health and social assistance recommending the use of the B C G vaccine and announcing that on application to the Ankara Institute of Hygiene physicians will be furnished with the vaccine without cost.

NETHERLANDS

(From Our Regular Correspondent)

Nov. 28, 1931.

A Peculiar Type of Polyneuritis

Dr. Ter Braak contributes an article to the *Nederlandsch Tijdschrift voor Geneeskunde* giving his observations in ten cases of polyneuritis that developed in Amsterdam, in women, during the space of three months, and characterized by: (1) predilection for the groups of muscles of the extremities and well delimited; (2) symmetry of the phenomena; (3) absence of objective disorders of sensibility, and (4) abolition of the Achilles reflex and persistence of the patellar reflex. In nine cases it was established with certainty that the women had, from ten to twenty days before the onset of the disease, made use of the same or of a similar means of inducing abortion. Every other cause appeared to be excluded. A similarity between this group of cases, clinically homogenous and of a special type, with other epidemic cases described in the fore part of 1930 in the United States under the name of "ginger paralysis" and due to the use of an adulterated extract of jamaica ginger was observable; and there was a still greater similarity to the cases of polyneuritis formerly but not so generally known, caused by creosote phosphate, a remedy formerly much recommended by charlatans for tuberculosis.

Nicotine Content of Cigars

Mr. Van Druten has recently published *(Versl. en Mededeel. betr. de Volksgezondheid)* the results of his researches on a large number of brands of cigars widely sold in the Nether-

lands. In the high-priced and in the cheap cigars, and in the mild as well as in the strong brands, the nicotine content was the same. In certain cigars sold as containing a minimum amount of nicotine, in smoking tobacco bearing a similar label, and in cigarets described as "absolutely harmless from the standpoint of nicotine," there was found a nicotine content only slightly under the average. One should not say that a product of this kind (cigar, cigaret or tobacco) contains little nicotine unless its nicotine content is below 0.5 per cent, a limit that was not obtained in any of the samples examined.

Aid for Unmarried Mothers

The incidence of illegitimate births is decreasing. It was 2.5 per cent in 1920 and only 1.8 per cent in 1929. From the inquiry it appears that the organizations that look after unmarried mothers give aid to a little more than half of the number known. The proposals of the commission appointed by the council on health are as follows: (1) the assurance of immediate social and medical aid (by means of communal medical services, municipal physicians and midwives, hospitals, and the like); (2) the giving of advice and support to the future mother when she makes herself known, this mission being fulfilled by the communal authorities, religious organizations, public welfare and social services, the municipal police, and the like (above all, the dispensaries of the prenatal consultation centers and the infant welfare stations have a part to play; likewise individual philanthropists; the inquiry showed that it is not always possible for future unmarried mothers to make known their condition and to ask aid; it would be well if the efforts of various organizations could be coordinated so as to secure uniform action; a well established central association with adequate branches would be useful as an intermediate agency when aid is furnished by the public authorities); (3) the rendering of aid for the periods before, during and after the confinement, and (4) the ferreting out in advance of persons who can and should contribute to the expense: the father and mother; the other members of the family; the guardian; the person responsible for the pregnancy, following a court action as to paternity of the child and the obligation of supporting it; private associations, and others.

Prenuptial Examination

The opinion of the council on health of the Netherlands concerning the institution of the prenuptial examination deserves mention. The association for the institution of the prenuptial medical examination in the Netherlands had requested that a civil official in each commune be designated who, before publication of the bans, should send a special notice to persons contemplating marriage and that the government should continue officially the propaganda in favor of the institution of the prenuptial examiination.

The council on health recognizes unanimously the value of a medical examination preceding marriage; it raises merely the question as to whether the intervention of the public authorities would be advisable. During the discussion, some espoused the affirmative, and referred, in support of their views, to the measures adopted in Scandinavian countries, where the presentation of a medical certificate, before entering into a marriage contract, is compulsory. But the general opinion of the council is that the problem has a hygienic aspect and a moral aspect, the latter being preponderant; hence, the administration is, in principle, poorly qualified to solve it. The moment designated for the official notice would seem, furthermore, to be poorly chosen. When the parties to the contract have already become engaged and arrangements have been made for the wedding there is considerable danger that medical advice may either not be followed or may cause, at a late hour, embarrassing difficulties. To this objection, supporters of the measure have replied that, even though the institution of the notification should have no immediate effect, the mere fact of its existence would have an indirect effect. But that would amount to mere propaganda, and for that other more efficacious means are available. It is rather by general publicity, supported by private initiative, that the goal sought will be attained.

MADRID

(From Our Regular Correspondent)

Dec. 10, 1931.

Attempted Attack on a Physician

Reports of several attacks on priests and physicians have been made of late. Dr. Madrazo of Valle del Pax, the founder of several sanatoriums in northern Spain and a well known retired surgeon of about 80 years who had spent his entire life for the benefit of mankind, was the victim of an attempted attack in which the criminals used a bomb. Fortunately, he escaped the explosion. The medical schools of several universities, as well as that of the University of Madrid, protested against the frequent attacks on physicians.

Representatives Who Are Physicians

Dr. Juarros, a psychiatrist and one of the representatives in the House of Delegates in Madrid, was questioned on the progress of a bill recently presented before the government in order that a law might be passed by which the services of public health will be a function of the government. To excuse the lack of interest of leading physicians, Dr. Juarros stated that it is difficult to convince the less forward looking members of the profession. The proposed law was defeated. Whenever anything really worth while is proposed to the representatives one may be sure of the failure of the proposal. Representatives who are physicians have not yet made any move in favor of the progress of sanitary, medical or social problems.

Defrauding English Physicians in Spain

During the last three months some English physicians received a circular letter inviting them to subscribe to the *Revista internacional médica*, with headquarters said to be located at the Calle Mayor de Villanueva y Geltrú, in Barcelona. With the invitation to subscribe, some tickets were sent which, it was asserted, would permit participation in a lottery in which costly items were raffled. The director of the journal was Mr. Vicente Peris. About a month ago, several English physicians received a letter informing them that their tickets had won the second prize, a valuable electric piano. In order to have a right to the piano, they were asked to send immediately the payment for a subscription to the medical journal, which amounted to £2. Dr. Hugues, who had apparently won the second prize, told his colleagues about his good luck and, to his surprise, it was discovered that most of them had also been informed that they had won similar prizes. The English physicians complained to the Spanish police through the English consulate. The Spanish police sent agents to the address which had been given as the headquarters of the journal, but when they arrived, the "editor" of the journal refused to open the door. He insulted them and a large crowd assembled. The man tried to escape. The servant of the "editor" simulated a fainting spell. When a physician entered to attend her, the policemen also entered. The "editor" was taken prisoner. The house was searched and a list containing names of English and American physicians was discovered. It is supposed that several English physicians have for some time been exploited in this way and that Mr. Peris never intended to look for an electric piano to be sent to his subscribers. He has been identified as the same person who a year ago tried to defraud in similar way some Spanish physicians. On that occasion, Mr. Vicente Ballester was an accomplice of Mr. Peris.

Marriages

CHARLES FREDERICK HENLEY, Jacksonville, Fla., to Miss Ruby Belle Chambers of Brunswick, Ga., Nov. 26, 1931.

REGINALD C. ALVERSON, Spartanburg, S. C., to Miss Ida Lee Kizer of St. George, in Allendale, Dec. 20, 1931.

HENRY CLAY SALMONS, Elkin, N. C., to Miss Willie Gertrude Michael of Kernersville, Dec. 17, 1931.

EDWIN JENNINGS CATHELL, Lexington, N. C., to Miss Margaret Selman of Atlanta, Ga., Dec. 26, 1931.

DANIEL DORCHESTER, Sturgeon Bay, Wis., to Miss Marie Rose Schmidt of St. Louis, Dec. 18, 1931.

HARRY H. DILLEY to Miss Jane Ramsey, both of Des Moines, Iowa, in Newton, Nov. 23, 1931.

WALLACE TAYLOR PARTCH to Miss Katherine Zoe Hall, both of Evansville, Ind., Nov. 28, 1931.

VICTOR LEVINE, Chicago, to Miss Wilhelmena A. Warner of Summitville, Ind., Dec. 18, 1931.

PAUL S. FISHBAUGH, Van Wert, Ohio, to Mrs. Julia B. Snipes of Marysville, Dec. 3, 1931.

WALTER A. REESE, Middletown, Ohio, to Miss Ruth Price, in Covington, Ky., Dec. 11, 1931.

LOVELL W. ROHR, Columbus, Ohio, to Miss Louise Kashner of Marion, in December, 1931.

EDMUND K. WALTER to Miss Theo Williamson, both of San Francisco, Dec. 2, 1931.

ROBERT B. WATSON, Memphis, Tenn., to Miss Elena Copenhaver, Nov. 25, 1931.

REZ D. PATTERSON, JR., Liberty, N. C., to Miss Cleo York, Dec. 19, 1931.

Deaths

Donald Macrae, Jr. ✠ Council Bluffs, Iowa; University of Michigan Medical School, Ann Arbor, 1891; member of the House of Delegates, 1922-1926, 1928, and 1930-1931, American Medical Association, and member of the Judicial Council since 1927; professor of anatomy, Omaha Medical College, 1893-1898, and professor of clinical surgery, University of Nebraska College of Medicine, Omaha, 1901-1912; past president and vice president of the Iowa State Medical Society and past president of the Medical Society of the Missouri Valley; member and past president of the Western Surgical Association and member of the American College of Surgeons; served during the Spanish-American War and the World War when he was decorated with the Croix de Guerre and Distinguished Service Medal; formerly mayor of Council Bluffs; on the surgical staff of the Jennie Edmundson Memorial Hospital; president of the Council Bluffs Clinic; aged 61; died, January 11, of pneumonia.

George Henry Fox ✠ Binghamton, N. Y.; University of Michigan Medical School, Ann Arbor, 1909; member of the American Society of Clinical Pathologists; past president of the Broome County Medical Society; nephew of Dr. George Henry Fox of New York, who is still living; aged 49; died, Dec. 26, 1931, in a hospital at Philadelphia, of cerebral hemorrhage.

Thomas Lewis Gilmer ✠ Chicago; Quincy (Ill.) College of Medicine, 1885; emeritus dean and professor of oral surgery, Northwestern University Dental School; member of the American College of Surgeons; oral surgeon to St. Luke's Hospital; aged 82; died, Dec. 28, 1931, in St. Vincent's Hospital, Los Angeles, of cerebral hemorrhage.

William Alvah Stewart, Pittsburgh; New York Homeopathic Medical College and Hospital, 1894; member of the American College of Surgeons; aged 69; surgeon to the Homeopathic Medical and Surgical Hospital and Dispensary, where he died, Dec. 6, 1931, of embolus of the coronary artery and diabetes mellitus.

Garrett Guy Ash, Bradford, Pa.; Western Pennsylvania Medical College, Pittsburgh, 1907; member of the Medical Society of the State of Pennsylvania and the American Academy of Ophthalmology and Oto-Laryngology; on the staff of the Bradford Hospital; aged 49; died, Oct. 14, 1931, of cirrhosis of the liver.

Herman Gustave Mertens, Bayfield, Wis.; Vanderbilt University School of Medicine, Nashville, Tenn., 1900; member of the State Medical Association of Wisconsin; veteran of the Spanish-American and World wars; health officer of Bayfield and formerly mayor; aged 56; died, Dec. 8, 1931, of angina pectoris.

Sylvia Geilrode Stuessy, Ypsilanti, Mich.; Woman's Medical College of Pennsylvania, Philadelphia, 1920; on the staff of the Ypsilanti State Hospital; aged 37; died, Dec. 11, 1931, in a hospital at Ann Arbor, of axillary and subpectoral abscess and intranasal hemorrhage with aspiration of blood.

Audley Weller Ricketts, Oil City, Pa.; Western Pennsylvania Medical College, Pittsburgh, 1904; member of the Medical Society of the State of Pennsylvania; aged 52; on the staff of the Oil City Hospital, where he died, Dec. 1, 1931, of coronary thrombosis.

Frederick William Walsh, Rockville, Conn.; College of Physicians and Surgeons, Baltimore, 1884; member of the Connecticut State Medical Society; on the staff of the Rockville City Hospital, aged 70; died, Dec. 20, 1931, of cerebral hemorrhage.

William Edgar Anderson, Englishtown, N. J.; Baltimore Medical College, 1898; member of the Medical Society of the State of New Jersey; for sixteen years member of the board of education; aged 64; died, Dec. 4, 1931, of heart disease.

Frank Anson Becker, New York; Medical Department of the University of the City of New York, 1883; member of the Medical Society of the State of New York; served during the World War; aged 75; died, Dec. 20, 1931, of pneumonia.

Charles William Allen, New York; Western Pennsylvania Medical College, Pittsburgh, 1903; member of the Medical Society of the State of Pennsylvania; aged 59; died, Nov. 25, 1931, in San Francisco, of carcinoma of the left lung.

Francis Marion McNair, Sugar Grove, Ill.; College of Physicians and Surgeons, Keokuk, Iowa, 1893; served during the World War; aged 64; died, Dec. 11, 1931, in the Edward Hines, Jr., Hospital, Hines, of heart disease.

Matthew J. Wilson, Philadelphia; University of Vermont College of Medicine, Burlington, 1883; formerly member of the board of education; aged 70; died, Dec. 15, 1931, of acute dilatation of the heart and arteriosclerosis.

John Timothy Donnelly, New Britain, Conn.; Fordham University School of Medicine, New York, 1920; member of the Connecticut State Medical Society; aged 40; died, Dec. 5, 1931, in a hospital at San Diego, Calif.

Theodore Ivan Tarasoff, Phoenix, Ariz.; University of Tomsk Faculty of Medicine, Tomsk, Russia, 1913; aged 53; was instantly killed, Dec. 3, 1931, when the automobile which he was driving was struck by a train.

Arthur Lawrence Linquist, Omaha; Bennett College of Eclectic Medicine and Surgery, Chicago, 1906; served during the World War; aged 48; died, Dec. 6, 1931, in the Nicholas Senn Hospital, of angina pectoris.

William Henry Evans ✠ Murphysboro, Ill.; College of Physicians and Surgeons of Chicago, School of Medicine of the University of Illinois, 1914; aged 43; died, Dec. 28, 1931, of diabetes mellitus and nephritis.

John C. Smith, Thompson, N. D.; Victoria University Medical Department, Coburg, Ont., Canada, 1887; member of the North Dakota State Medical Association; aged 76; died, Dec. 26, 1931, of heart disease.

Alonzo Terrell Ray, Sharon, Ga.; University of Georgia Medical Department, Augusta, 1893; member of the Medical Association of Georgia; aged 61; died, Nov. 24, 1931, of myocarditis and chronic nephritis.

George Murray Henbest ✠ Freeport, Ill.; College of Physicians and Surgeons of Chicago, School of Medicine of the University of Illinois, 1901; aged 63; died, Dec. 1, 1931, of carcinoma of the bladder.

William Edward Applehaus ✠ Louisville, Ky.; University of Louisville School of Medicine, 1923; served during the World War; aged 32; was found dead, Dec. 16, 1931, of a self-inflicted bullet wound.

Edgar Bacon Stokes ✠ Crockett, Texas; University of Louisville (Ky.) School of Medicine, 1892; president of the Houston County Medical Society; aged 65; died, Dec. 9, 1931, in a hospital at Houston.

Marion Love Cox, Canton, Texas; Kentucky School of Medicine, Louisville, 1894; member of the State Medical Association of Texas; bank president; aged 61; died, Oct. 29, 1931, of cerebral hemorrhage.

Robert DeWitt MacDonald, Knoxville, Tenn. (licensed, Tennessee, 1914); member of the Tennessee State Medical Association; aged 42; was killed, Dec. 14, 1931, in an automobile accident.

Thomas Cox Ely ✠ Philadelphia; University of Pennsylvania School of Medicine, Philadelphia, 1887; aged 68; died, Dec. 26, 1931, in the Presbyterian Hospital, of gastric hemorrhage.

John E. Copenhaver, Pilot Point, Texas; Kentucky School of Medicine, Louisville, 1896; member of the State Medical Association of Texas; aged 65; died, Dec. 8, 1931, of cerebral hemorrhage.

William T. Pratt, Rockville, Md.; College of Physicians and Surgeons, Baltimore, 1890; for many years health officer of Montgomery County; aged 63; died, Dec. 16, 1931, of heart disease.

Henry Abram Berry, Waller, Texas; Rush Medical College, Chicago, 1896; member of the State Medical Association of Texas; aged 68; died, Sept. 7, 1931, in a hospital at Houston.

Robert Franklin Stephens, Toledo, Ill.; Hospital College of Medicine, Louisville, Ky., 1897; aged 64; died, Dec. 16, 1931, of acute dilatation of the heart and pulmonary edema.

Austin Hutt, Columbus, Ohio; Starling Medical College, Columbus, 1878; member of the Ohio State Medical Association; aged 79; died, Nov. 18, 1931, of carcinoma of the stomach.

John Wesley Ellenberger ✠ Harrisburg, Pa.; Jefferson Medical College of Philadelphia, 1879; aged 73; died, Nov. 11, 1931, in the Harrisburg Hospital, of cardiovascular renal disease.

William Hedges Baldwin, Berkeley, Calif.; Jefferson Medical College of Philadelphia, 1875; aged 81; died, Nov. 25, 1931, of occlusion of the coronary artery and arteriosclerosis.

John Rhoads ✠ Ringtown, Pa.; Jefferson Medical College of Philadelphia, 1902; past president of the Schuylkill County Medical Society; aged 54; died, Nov. 26, 1931, of pneumonia.

William Lee Abel, Dayton, Tenn.; Vanderbilt University School of Medicine, Nashville, 1893; aged 62; died, Dec. 18, 1931, of pulmonary tuberculosis and ulcer of the larynx.

Henry R. Butler, Atlanta, Ga.; Meharry Medical College, Nashville, Tenn., 1890; aged 71; died, Dec. 17, 1931, of coronary thrombosis, chronic myocarditis and angina pectoris.

B. **O. Rand,** Milton, Ky.; Central College of Physicians and Surgeons, Indianapolis, 1903; aged 60; died, Nov. 21, 1931, of multiple sclerosis and cardiorenal disease.

William P. Salbreiter ✠ Racine, Wis.; Milwaukee Medical College, 1907; served during the World War; aged 51; died, Dec. 12, 1931, of cerebral hemorrhage.

Harry Laurin Lott, Knoxville, Tenn.; Homeopathic Medical College of Missouri, St. Louis, 1891; aged 64; died, Dec. 14, 1931, in the Fort Sanders Hospital.

Clarence Chilton Pearce, Pennington Gap, Va.; University of Louisville (Ky.) School of Medicine, 1906; aged 46; died, Nov. 30, 1931, of pneumonia.

Charles Virgin Porter, Viroqua, Wis.; University of Michigan Medical School, Ann Arbor, 1875; aged 82; died, Nov. 30, 1931, of heart disease.

Howe H. Wallace, Hopkinsville, Ky.; University of Louisville School of Medicine, 1883; aged 72; died, Dec. 11, 1931, of a self-inflicted bullet wound.

Clinton Henry Bell, Cleveland; Western Reserve University Medical Department, Cleveland, 1900; aged 55; died, Dec. 11, 1931, of lobar pneumonia.

Julius Zulch, Zulch, Texas; Tulane University of Louisiana School of Medicine, New Orleans, 1890; aged 62; died, Nov. 21, 1931, of pneumonia.

Archibald Merritt Burt, Mannington, W. Va.; College of Physicians and Surgeons, Baltimore, 1904; aged 50; died, Dec. 15, 1931, of brain tumor.

Oscar Nelson Rice, Adrian, Mich.; Michigan College of Medicine and Surgery, Detroit, 1893; aged 65; died, Dec. 6, 1931, of heart disease.

David H. Miller, Newark, Ohio; Columbus Medical College, 1884; aged 75; died, Dec. 6, 1931, of uremia and chronic interstitial nephritis.

Byron Bushnell Viets, Los Angeles; Homeopathic Hospital College, Cleveland, 1880; aged 82; died, Oct. 8, 1931, of arteriosclerosis.

Edgar William Ammann, St. Louis; St. Louis University School of Medicine, 1904; aged 51; died, Nov. 24, 1931, of heart disease.

Rinaldo E. Egbert, Marion, Ind.; Rush Medical College, Chicago, 1871; aged 84; died, Dec. 16, 1931, of organic heart disease.

Ruben D. Burrow, Los Angeles; Kentucky School of Medicine, Louisville, 1892; aged 75; died, Oct. 14, 1931.

Correspondence

SEX HORMONES AND OVARIAN EXTRACTS IN THE TREATMENT OF HEMOPHILIA

To the Editor:—In THE JOURNAL, July 25, 1931, page 244, there appeared a preliminary report on the treatment of hemophilia (in males) with female sex hormone, by Dr. Carroll LaFleur Birch of Chicago. Birch also published a report on the treatment of two patients with high grade hemophilia by means of ovarian extract—two brothers, one aged 10 years and one older, who, after treatment with ovarian extract, also received a fresh human ovarian transplant into the anterior abdominal wall (*Proc. Soc. Exper. Biol. & Med.* **28**:752 [April] 1931). In connection with this report it might be of interest to note that F. Wibaut, an ophthalmologist of Amsterdam, used female hormone in the treatment of retinitis pigmentosa because this condition occurred much more frequently and more severely in males, since 1927 (*Deutsche med. Wchnschr.* **57**:1739 [Oct. 9] 1931).

Snapper (*Geneeskundige Kring Amsterdam*) treated three male patients with Buerger's disease by means of female sex hormone (Menformon) because Buerger's disease also affects men more commonly than women.

Birch overlooked the paper by Lachlan Grant on "Hemophilia and Its Treatment" (*Lancet* **2**:1279 [Nov. 5] 1904) and the editorial on this subject (page 1299). Grant suggested the use of ovarian extract because he thought that females are shielded against this hemorrhagic diathesis by the protective influence of the ovaries.

E. Grawitz also refers to these observations in his books: Klinische Pathologie des Blutes, Leipzig, Georg Thieme, 1906, page 569; Hämatologie des praktischen Arztes, Leipzig, Georg Thieme, 1907, page 202.

Mention might be made of fifteen or twenty scattered reports in the literature of hemophilia in females. Goodall thinks that hemophilia occurs in women (Přerovský, K.: Hämophilie beim Weibe, *Bratisl. lekár. listy* **11**:26-34, 57-64, 97-105, 145-155, 1931). "Weibliche Hämophilie" had been reported by Bucura (Vienna, 1920), Klinger (1916, 1918), Koch and Klein (1912), Lieven (1919), Peters (1919) and others.

HYMAN I. GOLDSTEIN, M.D., Camden, N. J.

THE ROSS AWARD FUND

To the Editor:—The Ross Award Fund of America has been created in honor of Sir Ronald Ross and in support of the Ross Institute of London. The discovery by Sir Ronald Ross of the causative factor in malaria has probably done more for the health of the world than any corresponding discovery in medicine. The discovery was made under inconceivable difficulties, hardships and discouragements. All those who are particularly interested in malaria should welcome this opportunity of assisting in raising a sufficient fund to show the appreciation of America to this distinguished scientist who has been honored with the Nobel Prize and with many other foreign marks of distinction. The chairman of the board of trustees is Sir James Barr, and the secretary, to whom subscriptions should be sent, is Dr. Robert L. Pitfield, 5211 Wayne Avenue, Germantown, Pa.

As observed in the circular of the fund: "This benefactor to America is a poor man. He is old and crippled by paralysis, but he still labors for his daily bread. He has been more important by far than many clever inventors who have accumulated huge fortunes through labor-saving devices and inventions. His work has been unselfishly and abundantly given to everybody and without price." It is to be hoped that there will be a generous response to this appeal and a subscription, large

or small, should be sent, as stated, to Dr. Robert L. Pitfield. This appeal was recently unanimously endorsed by the National Malaria Committee at its annual meeting in New Orleans.

FREDERICK L. HOFFMAN,
Wellesley Hills, Mass.

SUGGESTION FOR USE IN LOCAL ANESTHESIA

To the Editor:—Numerous patients who have undergone operations under local and spinal anesthesia have commented after the operation, on the conversation between the surgeons discussing details of the procedure, in many instances causing mental anguish and alarm to the patient.

I have been in the habit of packing the external auditory canal with absorbent cotton dipped in liquid petrolatum, thereby blocking sounds to the internal ear. Any other method that will effectively block the canal will be satisfactory. It prevents the patient from hearing conversations between the surgeon and the nurses, and the movements of instruments against the tissue and bone, the result being that the relaxation is complete both mentally and physically, which is greatly to be desired both for the patient and for the surgeon.

I. RUEBERT SMITH, M.D. (TOR.), M.R.C.S. (ENG.),
L.R.C.P. (LON.), Toronto.

Queries and Minor Notes

ANONYMOUS COMMUNICATIONS and queries on postal cards will not be noticed. Every letter must contain the writer's name and address, but these will be omitted, on request.

CONSTIPATION IN INFANCY

To the Editor:—My baby, 1 year old, has suffered from constipation from birth. At first, while it was necessary to resort to enemas or laxatives, the stools were soft and normal; later they became hard and dry. He had been on supplementary feedings of cow's milk from the age of 3 months until about 7 months. At that time he was placed on a modified cow's milk feeding. His diet has been gradually increased, until now he takes stewed fruits and vegetables together with his milk. Instead of improving, the constipation has become perhaps a little worse on this diet. He has been given milk of magnesia for constipation, but lately this has been ineffective, so that enemas also have been used. Recently there have been several gastro-intestinal upsets of an alarming nature, and I feel that the constipation is the cause. If you could suggest a cause and a remedy for it, I should be grateful. Please omit name and address.

M.D., Arkansas.

ANSWER.—In considering constipation in an infant of this age, it is important to determine the cause. In many instances, constipation is due to improper food, such as excessive milk feeding or a high protein diet. Another cause may be the inability of the infant to use the abdominal press and the expulsive force necessary for defecation. Some infants show no desire to help nature in this process; in other instances there is pain on defecation, due to anal fissure or ulcer in the lower part of the rectum. Sometimes the constipation is due to a constitutional condition such as hypothyroidism, or it may be due to a long or a large sigmoid or an excessively long sigmoid with reduplication of the intestinal coils, such as occurs in Hirschsprung's disease.

The treatment advised for constipation is principally dietetic, and consists of giving stewed fruit, applesauce, prunes, plums or apricots several times daily, and also vegetables once or twice daily. Coarse cereals, such as whole wheat, oatmeal or hominy, are also indicated; to these a small amount of bran may be added as well as a portion of butter. The daily quantity of milk should be diminished, and the addition of malt soup extract to the milk is of definite laxative value.

The habitual use of ordinary cathartics is of doubtful value; indeed, they may do harm. If a cathartic must be used, some preparation of liquid petrolatum is preferred; this may be given morning and evening, though even this medication should be avoided if results can be obtained by regulation of the diet.

Large injections should be avoided. Two ounces of oil or physiologic solution of sodium chloride in young infants, and from 3 to 6 ounces in older children will usually bring results.

Constitutional symptoms due to hypothyroidism should be treated by the administration of desiccated thyroid gland, and abnormalities of the colon by symptomatic methods.

PRESENCE OF SPIROCHETE IN CONGENITAL SYPHILIS

To the Editor:—A patient, aged 14, with unmistakable evidence of congenital syphilis—enlarged liver and spleen, Hitchinson's teeth, bilateral keratitis now quiescent, optic neuritis now quiescent and stunted growth—shows no evidence of neurosyphilis. Does this patient's circulating blood carry the spirochete? Do the cutaneous and subcutaneous tissue juices harbor the spirochete? As an associate of other children is he a source of contagion? Please outline briefly an accepted treatment. The liver is enormously enlarged, some ascites is present; the patient is short-winded; the mentality is normal for the patient's age. I do not expect a cure. I hesitate to give arsphenamine or bismuth compounds. Yellow mercurous iodide does not aid. Tonics are without effect.

O. Y. JAMES, M.D., Cooper, Texas.

ANSWER.—The patient with prenatal syphilis evidently presents the rather rare hepatosplenic involvement which few patients in whom it develops early in life are likely to survive. The patient's circulating blood probably does not contain Spirochaeta pallida at this time in the course of the disease. The cutaneous and subcutaneous tissue juices are likewise spirochete free. Organisms could probably be found in foci in the liver and spleen, but they are entirely inaccessible in the ordinary contacts of life. The child is not a danger to other children as a source of contagion in ordinary contact.

So far as the matter of accepted treatment is concerned, the proponent of the question is wise in hesitating to give either arsphenamine or bismuth preparations. Arsphenamine should certainly not be used in this case, and bismuth preparations probably not. The treatment most acceptable to those who have seen the most of this condition is mercurial inunctions and liberal doses of iodide by mouth. At age 14, if the patient is well grown, a 4 Gm. 50 per cent inunction can be given in courses of forty; one may use the Cole clean inunction technic and rub in the drug for thirty minutes, six nights a week, or one may employ instead the older six day "dirty" rub and a bath once a week. The use of a rubber belt, as recently described in Venereal Disease Information published by the United States Public Health Service, for maintaining the inunction effect, might be satisfactory in this case, depending on the cooperation obtainable from the patient.

Splenectomy can be considered in cases of this type as the patient grows older, but it is a serious operation, to be performed only by a surgeon who has had more than casual experience in it. The effect on a persistent anemia would probably be good, and the patient might secure a considerable constitutional response. The risk, however, is great and should be carefully weighed.

The inunction and iodide treatment in a case of this sort should be continued for at least two years, the dose of iodide averaging from 2 to 3.25 Gm. (30 to 50 grains) three times a day, two months on and one month off throughout the year, and the inunctions being given, as previously stated, in courses of forty, with one month's rest between courses the first year and two months the second year. These therapeutic recommendations are of course subject to modification with the course or complications in the individual case. It is important that attention be given the teeth and that mouth prophylaxis be employed continuously throughout the treatment period. The subsequent use of bismuth therapy after the first year should be considered only after competent consultation.

ETIOLOGY OF ABDOMINAL PAIN IN A CHILD

To the Editor:—A boy, aged 4 years, since the age of 3½ months has had attacks of excruciating pain in the abdomen in the region of the umbilicus, constant for from five to thirty minutes; he screams and twists on the bed apparently in great agony. He holds his hands over the lower portion of the abdomen, draws his legs up, and rolls over. These attacks have occurred regularly every day for the last week but there have been long periods when he was free. The first attack was noted at 3½ months. They occur irregularly night or day, usually at night. There is no vomiting, distention or constipation. Recovery is usually quite sudden, and few effects are then noted. The observations are quite negative for a healthy boy of 4 years: The temperature is 98; the pulse, normal; the white blood cells, 14,000; the urine is clear and alkaline, and does not contain albumin or pus cells. No tenderness or rigidity is noted. No masses are palpable in the abdominal cavity. Please omit name.

M.D., Illinois.

ANSWER.—It would be hazardous to make a dogmatic diagnosis in this case. There are so many conditions that may cause pain in the region of the umbilicus that one must give them all careful consideration. It is well known that pneumonia, pericarditis, pleurisy, peritonitis and the hyperesthesia of meningitis may give rise to acute abdominal pain.

Since the patient has recurring attacks which disappear spontaneously, one is inclined to exclude appendicitis. Indeed, without abdominal rigidity and localized tenderness, in association with fever and vomiting, one would hesitate to make

such a diagnosis. If the patient was suffering from an inflammation of the appendix, one would expect acute and objective manifestations at some period during the attacks.

Among other intra-abdominal causes for the recurrent attacks of pain, one should consider rheumatism or myositis of the abdominal muscles, and hernia of the omentum into the linea alba, due to a diastasis or congenital defect. This frequently constitutes the condition known as epigastric hernia, which is characterized by a small protrusion of extraperitoneal fat in the supra-umbilical region. This protrusion causes pain and is sensitive to pressure. Nausea and vomiting are sometimes associated with intra-abdominal pain. If the small pedunculated protrusion of fat is exposed by dissection, no sac of peritoneum is found.

Among other possibilities are ileus, spastic colon, tuberculous mesenteric glands, pyelitis, cystitis, perinephric abscess, and kidney tumor. Pancreatitis is of rare occurrence and is usually associated with a parotitis epidemica. Orchitis and torsion of the spermatic cord may give rise to severe abdominal pain. Tuberculous spondylitis has been found to be the cause of acute abdominal pain.

After all these conditions have been excluded, it is well known by many clinicians that there is a group of children in whom no organic basis for the abdominal pain can be found. Albert H. Rowe, in discussing gastro-intestinal allergy (THE JOURNAL, Nov. 14, 1931), considers that it is a common cause of digestive disturbances, food intolerances, colic and pylorospasm in infants and young children.

In conclusion, there is a group in which no organic cause for enteralgia can be ascertained. In children of 4 years and over, one meets these recurrent attacks of colic. The attacks occur frequently in some children; in others, intervals of months or weeks may elapse. Pain comes on suddenly in the midst of play or during sleep. It may be so severe that the child becomes pale, with the legs flexed on the abdomen, and lies in bed complaining of severe pain. The temperature may be moderately elevated, though the attack is of short duration and there are no objective abdominal observations. The etiology of these attacks is not definitely known. They are possibly due to a spasm of the intestine or of the vessels or, as has already been noted, to a food allergy, which must be searched for, with subsequent elimination of the offending foodstuff.

AEROPHAGY

To the Editor:—A woman, aged 52, tall and robust, well nourished, has pain in the abdomen. She had muscular rheumatism when she was about 10 years of age, and typhoid, pneumonia, tonsillitis, neuritis and cholecystectomy in January, 1927. About three weeks after leaving the hospital, after eating she began to have pain, originating in the epigastrium and running through to the back. The stomach becomes markedly swollen and the patient does not get relief until she gets rid of large quantities of gas. The attacks come irrespective of the type of food eaten. The attacks gradually became worse until they would occur at any time during the day or night. When walking along the street, she would have the pain and shortness of breath, would have to hang on to something, and would not get relief until she vomited a large quantity of pinkish froth. She has shortness of breath on exertion and has pain around the heart, the pain sometimes running down the left arm. Her menses began at 13 years; she has one daughter living, aged 32, and she had one miscarriage; she still menstruates regularly, all symptoms being worse at this time; she has constipation and has to use laxatives all the time. On examination it was found that the head, nose, lungs and throat were normal; there was a presystolic murmur in the mitral and aortic regions; the blood pressure was 160 systolic and 98 diastolic; the pulse was regular, with a rate of 120; the abdomen showed a new Mayo-Robson scar, and there was tenderness over this area on deep palpation. Urinalysis gave negative results. Gastric analysis with a Boas test meal showed free hydrochloric acid, 20; total acidity, 42, and occult blood, negative; 98 cc. was obtained and a great deal of greenish yellow bile. A roentgenogram in June, 1930, showed that the stomach was normal except for moderate ptosis; the duodenum was normal; there was a filling defect in the cecum with retention of barium in a forty-eight hour test; adhesions were noted in the right lower quadrant, and redundance of the sigmoid. At operation in June, 1930, multiple omental adhesions were released, a left dermoid cyst was removed, and dense bands of adhesions partially obliterating the cecum almost up to the transverse colon were freed. The patient felt very well for several months; then the symptoms returned as before. As a rule, she feels all right in the morning. About noon, gas begins to form, so that by evening the abdomen looks like a full term pregnancy. There is just one exception; that is, now the pain starts in the right iliac region instead of in the epigastrium. Please omit name.

M.D., Virginia.

ANSWER.—This case presents the picture of aerophagy with associated recurrent adhesions of the bowel and probable involvement of the omentum. There is also a suggested element of duodenal stasis. From the therapeutic standpoint, it might be suggested that, in spite of the normal acidity present in the stomach, diluted hydrochloric acid, 1.25 cc., be given half an hour after meals. It might also be of value to support the stomach by a suitable corset and pad. The patient should be instructed in the proper method of chewing and swallowing food. A bland diet, free from cellulose and low in starch, is advisable. Retention enemas of liquid petrolatum should be given nightly, and foci of infection in the oral cavity should be removed if found.

WRIST DROP IN DEMENTIA PARALYTICA WITH TABES

To the Editor:—A man, aged 54, suffered wrist drop and was found to have dementia paralytica with tabes, with characteristic changes in the blood and spinal fluid. The therapy recommended included malaria, twelve weekly injections of 1 grain (0.065 Gm.) of silver arsphenamine, and mercury and bismuth preparations biweekly intramuscularly. 1. How long an interval should there be following malaria, before silver arsphenamine therapy is begun? 2. Should one injection of a mercury preparation and one of a bismuth preparation be given weekly? 3. Which preparations are desirable and what dosage is proper? 4. What therapy should succeed this initial course? 5. Is potassium iodide of any value? Please omit name and address.

M.D., New York.

ANSWER.—Arsphenamine therapy may be given immediately after the malaria treatment; in fact, arsphenamine may be used to stop the paroxysms of malaria. Potassium iodide is not of great value unless it is given in large doses intravenously; sodium iodide should be substituted for this. Mercury therapy may be given in weekly injections without the addition of bismuth preparations. The wrist drop should be gone into more thoroughly, since, as a symptom of dementia paralytica with tabes, it is rather unusual.

ANGINOID PAIN AFTER HEMORRHAGE

To the Editor:—Of what significance is anginoid pain in the chest following hemorrhage which has occurred over a period of days or weeks? I have observed two patients recently, both of whom had had abortions followed by rather prolonged bleeding. In one the red count has been normal on two occasions, but the pain continues at intervals. There is no fever or pelvic complication. The condition is unaffected by respiration or cough or position. The lungs are clear to physical examination and the heart sounds are normal. There are no murmurs, shocks or thrills. The pulse is slow and regular. Evidently the bloodless count and volume are back to normal. I should appreciate any references to the literature. The condition has also been seen following tonsillectomy.

E. F. KEARNEY, M.D., Oregon, Mo.

ANSWER.—Angina pectoris has been noted in association with severe secondary as well as pernicious anemia. The notion that prevails as to pathogenesis of this condition is that blood going through a coronary artery that is perhaps narrowed in its lumen is not competent, both because of its inferior quality and because of its lessened quantity, to nourish properly the portion of the myocardium that it irrigates. This part of the myocardium is, therefore, relatively ischemic; on effort it responds inefficiently, and anginal pain results. This may account for the attacks described. A discussion of this feature of angina, with a bibliography, can be found in an article by James B. Herrick in the *American Heart Journal* **2**:351 (April)1927.

On the basis of the information furnished, one must hesitate to state what may be the nature of the pain that occurs occasionally in this patient, even after the blood has returned to normal. What seems to provoke the individual attacks is not stated. The phenomena of "anginoid pain" are not set forth; nor is there a record of the condition of the arteries, the blood pressure or the size of the heart. The possibility of a nervous disturbance, a "cardiac neurosis," would also have to be considered.

SENSITIZATION TO CHRYSANTHEMUM

To the Editors:—Two of my patients, both florists, are seemingly affected by the pollen or dust of chrysanthemums. Whenever they are at work about these flowers, the skin of their hands and faces cracks, and a rash appears. Can anything be done to ascertain whether or not the "flower dust" causes this trouble? What can be done to prevent a recurrence and to treat the condition? Please omit name.

M.D., California.

ANSWER.—Dermatitis from chrysanthemums is not uncommon and apparently comes from direct contact with the petals, not from the pollen. It is not a matter of inhalation but of direct irritation of the skin and, of course, occurs only when the flower is handled; therefore florists are the chief victims. Patch (contact) tests will usually show the cause. Some of the petals should be pulverized, moistened with water and applied on a piece of gauze about 1 inch square to a part of the back that has been cleansed with soap and water. A square of oiled silk should be placed over the gauze, secured by adhesive tape, and

left on for from twenty-four to seventy-two hours. A dermatitis will result if the petals cause the trouble. A similar test may be made with the pollen but will probably give negative results. Cutaneous and intracutaneous tests may be tried also, but the contact test will probably suffice and is simple. Preventive treatment may be difficult, but the wearing of surgical rubber gloves is advisable when chrysanthemums are handled, and the florists should be warned not to touch their faces when handling these flowers. If the condition persists after these precautions, desensitization by hypodermic injections of an extract of the petals will probably be successful if carried out correctly; i. e., by initial small dosage and gradual increase.

PNEUMONIA AND CONGENITAL SYPHILIS

To the Editor:—A well nourished infant, aged 3 months, was admitted to the hospital with all the signs and symptoms of congenital syphilis. The blood Wassermann reaction was strongly positive, and lesions in the long bones as demonstrated by the roentgenograms were fairly typical of the osseous lesions of congenital syphilis. Before treatment could be instituted, fever developed, ranging from 101 to 105 F., and definite signs of pneumonia were found. Now, of course, the child is critically ill. In your opinion, should this child be given antisyphilitic treatment in spite of the fever and intercurrent infection? If so, what drug would you use and by what route? Please give references to the literature on this subject.

CLARENCE F. FRIEDMAN, M.D., Brooklyn.

ANSWER.—The effect of intercurrent syphilis on pneumonia is usually that of prolonging the course and delaying the resolution rather than of increasing the acuteness of the symptoms during the active stage. It seems improbable that this child will live, and it is impossible to predict in its febrile condition just what the effect of an attempt to institute antisyphilitic therapy will be. If the inquirer desires to take the risk, an intramuscular injection of 0.01 Gm. of bismuth salicylate may be given intramuscularly and repeated in three or four days. If the characteristic pneumonia crisis appears, treatment may then be continued and gradually intensified. If resolution is delayed, but the child survives the initial stage, bismuth therapy is strongly indicated. There is considerable risk in attempting intravenous neoarsphenamine therapy in the febrile state, and this form of treatment is not recommended.

The syphilitic complications of acute lobar pneumonia when the two diseases are intercurrent have been discussed by Head and Seabloom, with a report of three cases of delayed resolution suggesting interlobar pleurisy or empyema. Rapid cure followed the administration of arsphenamine. Piersol, Stanley, Floyd and Fitz-Hugh have also discussed the subject within recent years.

IMMUNITY TO DIPHTHERIA

To the Editor:—Six years ago, when my son was 4 months old, I gave him two doses of toxin-antitoxin. This I did when treating a diphtheria case, on the advice of another physician. Should I do a Schick test, and what would it prove? Should I give him toxoid, which seems to be the better preparation, to immunize against diphtheria? Or, lastly, is he immune? Please omit name.

M.D., Kentucky.

ANSWER.—A Schick test should be made. It will show whether the child is susceptible to diphtheria. If he is susceptible, diphtheria toxoid would be preferable to toxin-antitoxin for further immunization. He is not necessarily immune after the two doses of toxin-antitoxin.

SWELLING OF HANDS AND FEET IN PREGNANCY

To the Editor:—I have a patient five months advanced in pregnancy who complains of swelling of the hands and feet, which is particularly marked in the hands and causes great pain in these extremities. Urinalysis gives negative results; the blood pressure is normal, and all other observations are negative. The patient is a primipara, aged 33, who has enjoyed good general health and still seems to be in excellent health. In addition to the swelling she complains of a dull pain, resembling a toothache, in the left upper abdominal quadrant. This pain does not seem to be related to the taking of food or to anything else and is about the same twenty-four hours in the day. Consultation has not increased my understanding of these symptoms, and I shall be obliged for information in regard to diagnosis and treatment of the case.

HOWARD K. SHROM, M.D., Detroit.

ANSWER.—This is truly a puzzling case. The swelling and pain of the hands and feet may be due to a condition resembling Raynaud's disease and may have nothing to do with the pregnancy. On the other hand, the edema may be caused by a local increase in the permeability of the blood vessels, but the reason for this is hard to conjecture. The pain in the left upper abdominal quadrant probably does not have any connection with the edema and pain in the extremities. The only organ in this region that might produce pain is the spleen, and in most instances in which the spleen is painful it is enlarged and easily outlined. If a disease not associated with pregnancy is found as the cause of the pain and edema, treatment must, of course, be directed toward the relief of this disease; otherwise the therapy must be symptomatic, and this is far from satisfactory.

INFECTIOUS ATROPHIC ARTHRITIS

To the Editor:—About one week ago a woman, aged 35, suffering from mucous colitis, noticed sharp twinges of pain in the terminal phalangeal joints of the toes, with no swelling or redness, but extreme pain on movement of those joints. The following day, pain of the same type developed in the terminal phalangeal articulation of the fingers, and she already has tapering of the fourth and fifth fingers of both hands, and osteophytes on the articulation of the fifth fingers. Simultaneously, pains have developed in the knee joints, spine and sacro-iliac articulation, with attacks in the elbow and wrist joints. There is definite tenderness in these various joints, but no swelling. Four months ago the patient had agonizing pain in the left temporomandibular joint, which was extremely painful on motion; however, the pain cleared up in almost two weeks' time and has since not recurred. The patient has had a profuse leukorrheal discharge requiring frequent douching, ever since she had a left salpingo-oophorectomy eight years ago. The tonsils are enucleated, and roentgen examination did not reveal any unusual conditions in the teeth. The Wassermann reaction is negative. I have made a diagnosis of arthritis deformans. I should appreciate any suggestions that you might have to offer as to treatment and management of this case. Kindly omit name if published.

M.D., Pennsylvania.

ANSWER.—This is evidently a case of atrophic arthritis of infectious origin. Recommendations in the management of this case include the search for and removal of foci of infection, especially in the teeth, throat, gastro-intestinal tract and genito-urinary tract; local anodyne applications; splinting, for comfort and to prevent deformity; vaccines for nonspecific protein effect; a diet; endocrine glands as indicated, and physical therapy including radiant heat, very gentle massage and diathermy, depending on the patient's reaction.

INDICATIONS FOR OPERATION ON NASAL SEPTUM

To the Editor:—A man, aged 27, with a bilateral chronic ethmoiditis, has a deviated septum. Recently I removed nasal polyps from each side of the nose. He continues to have a purulent nasal discharge. Would you advise a submucous resection of the nasal septum in the presence of this infection? Please do not publish my name.

M.D., Illinois.

ANSWER.—The advisibility of a septum operation in this instance is entirely dependent on the individual's need for it. If the septum is so deviated that breathing is difficult and drainage is interfered with to such an extent that treatment of the ethmoiditis is difficult or its course toward healing is delayed, the presence of secretion is not an absolute contraindication. By suction, cleansing lotions, and the use of packs of a mild silver protein-U. S. P., such as silvol, the nose should be got into as favorable a state as possible, and the operation proceeded with.

BELLADONNA IN SPASTIC COLITIS

To the Editor:—I should like some information regarding the action of tincture of belladonna in spastic colitis. Can any disagreeable or habit forming effects follow from the daily use of the drug, gradually increased to get its physiologic effects? Is that the best drug to take to cause relaxation of colonic spasm? Kindly give me what information you have in regard thereto. Please omit name.

M.D., New Jersey.

ANSWER.—Tincture of belladonna is probably as good an antispasmodic as is known for the purpose. Its disagreeable effects, such as dryness of the mouth or dilatation of the pupils, indicate the limit to which it may be pushed. Habit formation need not be feared. The only objection to it is that it is merely symptomatic treatment; its administration should be accompanied by search for and treatment of the cause.

IMMUNITY TO TYPHOID IN TUBERCULOSIS

To the Editor:—Is there any form of tuberculosis, either acute miliary or otherwise, which will give a positive Widal reaction?

F. R. KELLY, M.D., Cleveland.

ANSWER.—So far as is known, there is no form of tuberculosis that regularly will stimulate the formation of agglutinins for the typhoid bacillus. In a person previously subjected to the antigenic influence of the typhoid bacillus, either from natural infection with the bacillus or from antityphoid vaccination, active tuberculosis perhaps might reawaken the production of typhoid agglutinins. The possible association of typhoid infection with tuberculosis may also be mentioned.

Council on Medical Education and Hospitals

COMING EXAMINATIONS

ALASKA: Juneau, March 1. Sec., Dr. Harry C. DeVighne, Juneau.

CALIFORNIA: Los Angeles, Feb. 1-4. Sec., Dr. Charles B. Pinkham, 420 State Office Bldg., Sacramento.

CONNECTICUT: *Basic Science.* New Haven, Feb. 13. Prerequisite to license examination. Address, State Board of Healing Arts, 1895 Yale Station, New Haven.

NATIONAL BOARD OF MEDICAL EXAMINERS: Examinations will be held in cities where there are five or more candidates, Feb. 24-26. Ex. Sec., Mr. Everett S. Elwood, 225 South Fifteenth St., Philadelphia.

NEVADA: *Reciprocity.* Carson City, Feb. 1. Sec., Dr. Edward E. Hamer, Carson City.

NEW YORK: Albany, Buffalo, New York, Syracuse, Feb. 1-4. Chief, Mr. Herbert J. Hamilton, Room 315, State Education Bldg., Albany.

PORTO RICO: San Juan, March 1. Sec., Dr. A. Ortiz Romeu, Diaz Garcia Clinic, San Juan.

VERMONT: Burlington, Feb. 9-11. Sec., Dr. W. Scott Nay, Underhill.

WYOMING: Cheyenne, Feb. 1. Sec., Dr. W. H. Hassed, Capitol Bldg., Cheyenne.

Illinois June Report

Mr. Paul B. Johnson, superintendent, Illinois Department of Registration and Education, reports the written and practical examination held at Chicago, June 23-26, 1931. The examination covered 10 subjects and included 100 questions. An average of 75 per cent was required to pass. Two hundred and sixteen candidates were examined, 199 of whom passed and 16 failed. The following colleges were represented:

College	PASSED	Year Grad.	Per Cent
Howard University School of Medicine		(1930)	84
Chicago Medical School		(1931)	75, 75, 75, 75, 76, 76, 76, 76, 77, 77, 77, 77, 78, 78, 78, 78, 78, 78, 80, 81, 83
Loyola University School of Medicine		(1930) (1931)	80, 75, 75, 76, 76, 76, 76, 76, 76, 76, 77, 77, 77, 77, 77, 77, 78, 78, 78, 78, 78, 78, 79, 79, 79, 79, 79, 79, 79, 80, 80, 80, 80, 81, 81, 81, 81, 81, 81, 81, 82, 82, 82, 82, 82, 82, 83, 84, 84, 84
Northwestern University Medical School		(1929) (1931)	80, 78, 78, 79, 79, 80, *, 80, 80, 81, 81, 81, 81, 82, 82, 82, 83, 83, 84, 85, 87
Rush Medical College		(1926) (1930)	80, 81, 81, 81, 81, 81, 81, 82, 82, 83, 83, 84, 84, 84, 85, 85, 85, 86, 86, 87
University of Illinois College of Medicine		(1931)	75, 76, 77, 77, 78, 78, 78, 78, 78, 79, 79, 80, 80, 80, 81, 81, 81, 81, 81, 81, 81, 82, 82, 82, 82, 82, 82, 82, 82, 82, 82, 82, 83, 83, 83, 83, 83, 83, 84, 84, 84, 84, 84, 84, 84, 84, 84, 85, 85, 85, 85, 85, 85, 86, 86, 86, 86
University of Michigan Medical School		(1930)	78
St. Louis University School of Medicine		(1930)	75, 79, 79
Washington University School of Medicine		(1922)	*
Columbia University College of Phys. and Surgs.		(1927)	85
University and Bellevue Hospital Medical College		(1930)	81
University of Pennsylvania School of Medicine		(1928)	84
Marquette University Medical School		(1931)	79
University of Wisconsin Medical School		(1930)	78

College	FAILED	Grad. Year	Cent Per
Chicago Medical School		(1927) (1930)	58, 65, (1931) 65, 69, 70, 73, 74
College of Med. and Surg. (Physio Medical), Chicago		(1911)	†
Loyola University School of Medicine		(1931)	71, 71, 71, 71, 73, 76,‡ 80 §
University of Illinois College of Medicine		(1931)	73

Mr. Johnson also reports the practical examination for reciprocity candidates held at Chicago, June 25, 1931. The examination covered four subjects. Twenty-two physicians were examined, 20 of whom passed and two failed. Six physicians were licensed by endorsement. The following colleges were represented:

College	LICENSED BY RECIPROCITY	Year Grad.	Reciprocity with
College of Physicians and Surgeons, Chicago		(1910)	Kansas
Northwestern University Medical School		(1930)	Missouri
Tulane University of Louisiana School of Medicine		(1917)	Louisiana
University of Minnesota Medical School		(1929)	Minnesota
St. Louis University School of Medicine		(1929), (1930)	Missouri
Washington University School of Medicine		(1929, 5), (1930)	Missouri
Medical College of Ohio		(1896)	Ohio
Hahnemann Med. College and Hosp. of Philadelphia		(1911)	Iowa
Medical College of the State of South Carolina		(1926)	Tennessee
Meharry Medical College		(1930, 2)	Tennessee
University of Texas School of Medicine		(1913)	Texas
University of Vermont College of Medicine		(1918)	Minnesota
University of Wisconsin Medical School		(1928)	Wisconsin
Temple University School of Medicine	FAILED	(1921)	Penna.
Meharry Medical Department of Walden University		(1910)	Georgia

College	LICENSED BY ENDORSEMENT	Year Grad.	Endorsement of
University of Illinois College of Medicine		(1931, 2)	U. S. Navy
Harvard University Medical School		(1929)	N. B. M. Ex.
Washington University School of Medicine		(1927)	N. B. M. Ex.
Meharry Medical College		(1928)	N. B. M. Ex.
University of Virginia Department of Medicine		(1925)	U. S. Army

* These candidates took the clinical test only. Passed the written examination in April.

† No grade given.

‡ Fell below 60 per cent in one subject.

§ Failed in clinical examinaton.

Wisconsin June-July Report

Dr. Robert E. Flynn, secretary, Wisconsin State Board of Medical Examiners, reports the oral, written and practical examination held at Milwaukee, June 30-July 1-2, 1931. The examination covered 19 subjects and included 100 questions. An average of 75 per cent was required to pass. Ninety-two candidates were examined, 81 of whom passed, 9 were conditioned in one subject, and 2 failed. Twenty-seven physicians were licensed by reciprocity with other states, and 1 physician was licensed by endorsement. The following colleges were represented:

College	PASSED	Year Grad.	Per Cent
Loyola University School of Medicine		(1930)	* 81
Northwestern University Medical School		(1931)	82, 87
St. Louis University School of Medicine		(1930)	85
University of Nebraska College of Medicine		(1930)	84
Marquette University School of Medicine		(1930) (1931)	92, 79, 81, 82, 82, 82, 82, 82, 83, 83, 83, 83, 84, 84, 84, 84, 84, 84, 85, 85, 85, 85, 85, 85, 85, 85, 86, 86, 86, 86, 86, 86, 86, 86, 87, 87, 87, 87, 87, 87, 87, 87, 88, 88, 89, 89, 89, 90, 91
University of Wisconsin Medical School		(1929) (1930)	89, 90, 81, 81, 83, 84, 84, 84, 84, 84, 85, 85, 85, 86, 86, 86, 87, 88, 88, 88, 88, 89, 89
Osteopaths		(1931, 2)	†

College	CONDITIONED IN ONE SUBJECT	Year Grad.	Number Conditioned
Northwestern University Medical School		(1931)	1
Marquette University School of Medicine		(1931, 5)	5
University of Wisconsin Medical School		(1929), (1930, 2)	3

College	FAILED	Year Grad.	Per Cent
Marquette University School of Medicine		(1931)	74
University of Wurzburg Faculty of Medicine		(1925)	63

College	LICENSED BY RECIPROCITY	Year Grad.	Reciprocity with
Loyola University School of Medicine		(1930)	Illinois
Northwestern University Medical School		(1931, 2)	Illinois
Rush Medical College		(1926), (1929)	Illinois
Indiana University School of Medicine		(1930)	Indiana
State Univ. of Iowa Coll. of Med.		(1928), (1929), (1930, 2)	Iowa
Univ. of Michigan Med. Sch.		(1925), (1926), (1929, 2), (1930)	Michigan
University of Minnesota Med Sch.		(1925), (1930, 2), (1931)	Minnesota
Ohio State University College of Medicine		(1925)	Ohio
University of Oregon Medical School		(1929)	Oregon
University of Tennessee College of Medicine		(1929)	Tennessee
Medical College of Virginia		(1930)	Ohio
Marquette University School of Medicine		(1929)	Indiana
University of Wisconsin Med. Sch.		(1927) Illinois, (1929)	Oklahoma
University of London Faculty of Medicine		(1900)	Nebraska

College	LICENSED BY ENDORSEMENT	Year Grad.	Endorsement of
Loyola University School of Medicine		(1931)	U. S. Navy

* This applicant has completed his medical course and will receive an M.D. degree on completion of an internship.

† Licensed to practice osteopathy and surgery.

Montana April Report

Dr. S. A. Cooney, secretary, Montana State Board of Medical Examiners, reports the written examination held at Helena, April 7-8, 1931. The examination covered 10 subjects and included 50 questions. An average of 75 per cent was required to pass. Two candidates were examined, both of whom passed. One physician was licensed by reciprocity. The following colleges were represented:

College	PASSED	Year Grad.	Per Cent
University of Illinois College of Medicine		(1930)	84.9
University of Nebraska College of Medicine		(1929)	83.4

College	LICENSED BY RECIPROCITY	Year Grad.	Reciprocity with
College of Medical Evangelists		(1927)	Maine

Book Notices

Experimental Studies on the Course of Paratyphoid Infections in Avitaminotic Rats with Special Reference to Vitamin A Deficiency. By H. C. A. Lassen. Paper. Price, 10 Danish Crowns. Pp. 248. Copenhagen: Levin & Munksgaard, 1931.

The author starts with the same thesis that every deficiency of nutrition, whether of quantitative or qualitative nature, is accompanied by an increased susceptibility to infection and a lowered resistance. On the basis of a detailed review of the observations now available, the author concludes that "the rôle of vitamin A as an anti-infectious factor appears indisputable; that vitamin B is hardly playing any rôle in this respect; that the opinions as to the importance of vitamin C in this respect are divergent, though it is most likely that this vitamin is hardly of any particular importance to the organism as far as resistance to infection goes; and, finally, that there is nothing directly suggestive of vitamin D having any resistance-increasing effect, and that for that matter the clinical material is less suitable for information on this point than is the clinical material concerning the other vitamins." He points out further a fact too often overlooked by clinicians, that it is frequently difficult to estimate the significance of a single vitamin as an anti-infectious factor on the basis of clinical observations on the morbidity and course of infections in avitaminoses, because in many cases the clinical avitaminoses are not clear cut, as the disease-producing diets are often deficient in more respects than one. There has been an attempt of late, on this side of the Atlantic, to assign direct anti-infective properties not only to a lack of vitamin A but also to a shortage of the antirachitic vitamin D. Lassen concludes from his own experiments that, in rats kept on a vitamin A and D free diet, spontaneous infections are extremely frequent after the avitaminotic symptoms have made their appearance. This result is not altered by giving the animals an addition of antirachitic factor. The volume presents a large number of experimental observations on laboratory animals (albino rats), dealing with the effects of both spontaneous and intentional infections. The results are interpreted to indicate that the decrease of resistance in A avitaminosis is due to a functional impairment of the bactericidal power of the reticulo-endothelial tissue. These studies are translated from a paper in Danish submitted to the Faculty of Medicine at the University of Copenhagen in 1930. A summary in Danish is appended.

Cancer and Race: A Study of the Incidence of Cancer Among Jews. By Maurice Sorsby, M.D., F.R.C.S., Hon. Assistant Surgeon, Ear, Nose and Throat Department, London Jewish Hospital. Conducted under the auspices of the Jewish Health Organisation of Great Britain. With a preface by Lieut.-Col. F. E. Fremantle, M.A., M.D., M.Ch., Consulting County Medical Officer of Health for Herts. Cloth. Price, $3. Pp. 120. New York: William Wood & Company, 1931.

An attempt is made in this book to discern some phases of the racial factor in the etiology of malignancy. Heretofore, attempts along these lines have failed to prove that ethnic derivation is an important factor. There have been various and sundry claims that the Jews, as compared with the nations and peoples among which they live, show differences in the incidence and the organs affected with malignant growths. Indeed, about thirty years ago several authors asserted that the Jews were immune to cancer, which of course was soon disproved. In this study, Dr. Sorsby analyzed the vital statistics of London, Vienna, Budapest, Warsaw and Leningrad and arrived at the sound conclusion that "the incidence of cancer among Jews in any city follows closely that obtaining among their fellow citizens." Available statistical evidence favors the view that "there is a closer relationship between the Jews and the non-Jews of any particular city than between the Jews of different cities." This would tend to indicate that any differences that may have been noted are not racial but more likely environmental. For many years, physicians and surgeons have noted that uterine, penile and buccal cavity cancer is less common among the Jews than among the non-Jews in a given community. The figures collected by Dr. Sorsby confirm these observations. The fact that penile cancer is also rare among Mohammedans forms the view that circumcision is of prophylactic value in this regard. The correlation of the alleged scarcity of syphilis among Jews with the rarity of cancer of the buccal cavity is rather strained. According to Sorsby, "thirty years ago syphilis was not considered in the differential diagnosis of an obscure (buccal) lesion in a Jew." But medical experience at present would tend to dissuade one from following this clinical advice, if it is agreed that syphilis is an important etiologic factor in the etiology of cancer of these organs. That Jewesses only rarely suffer from cancer of the uterus appears to be firmly established. Considering that the incidence of cancer of the uterus is closely associated with pregnancy, it is rather surprising that the former is rare among Jewesses, who are as prolific as most of those among whom they live. Sorsby suggests that "the Mosaic code, with its insistence on local cleanliness and abstention from sexual intercourse during the presence of a blood-stained discharge, supplies the factor." However, this ritual bath *(mikvah)* is by far not as cleansing as an ordinary vaginal douche, and it is indulged in only by strictly orthodox Jews in the Orient and in eastern Europe, and but little in such cities as London and New York. In fact, after discussing the subject in detail, Dr. Sorsby says that his "explanation may be wrong." On the other hand, the "high incidence of intestinal cancer among Jews presents perplexities not easily explained away." The author is on safe ground when he concludes that "the total mortality from cancer varies in different communities, tending to approach that of the non-Jews of that particular city; i. e., it follows a geographical rather than a racial distribution." He fails when he asserts that "the discrepancies between the distribution of cancer by organs as seen in Jews and non-Jews finds its explanation in the mode of life led by the Jews." While the book contains little, if anything, that appears to be a valuable contribution to the obscure etiology of cancer at the present state of our knowledge, it nevertheless will be found of immense value to those who attempt to delve into the problems of racial pathology. There is an excellent bibliography and an index.

Erkrankungen des vegetativen Nervensystems. Von Erich Leschke, Professor für innere Medizin an der Universität Berlin. Durch einen Nachtrag erweiterter Sonderdruck aus dem „Handbuch der inneren Sekretion," Band III. 1. Hälfte. Herausgegeben von Dr. Max Hirsch. Paper. Price, 24 marks. Pp. 1019-1182; 1-53, with 10 illustrations. Leipzig: Curt Kabitzsch, 1931.

This is a reprint of the author's article in the third volume of the "Handbuch der inneren Sekretion," edited by Max Hirsch of Berlin. It has an appendix giving a review of the most recent literature. It is a mine of information for internists, neurologists, physiologists and pharmacologists, and approaches the various phenomena of the vegetative system from every possible angle. The author goes far in stressing the part played by lesions of the still somewhat hypothetic hypothalamic and striatal vegetative centers in a multitude of conditions, including epilepsy, migraine, arterial hypertension, myopathies and diabetes mellitus. However, the wealth of concisely presented objective data makes the book of equal value as a work of reference to those who may not share many of the views held by the author.

Handbook of Physiology. By W. D. Halliburton, M.D., LL.D., F.R.C.P., and R. J. S. McDowall, M.B., D.Sc., F.R.C.P., Professor of Physiology, University of London, King's College. Nineteenth edition. Cloth. Price, $4.75. Pp. 842, with 415 illustrations. Philadelphia: P. Blakiston's Son & Company, 1930.

This book is a lineal descendant of Kirke's "Physiology," which was first published in 1848. In due time, Professor Halliburton rewrote and reedited it so thoroughly that the book subsequently appeared under his name. The amount of histologic material has been greatly curtailed, but the book still contains a considerable amount of biochemistry. No intimation is given as to the type of student for whom the book is written. If designed for medical students, it is quite inadequate. Considering the more thorough textbooks available for medical students in England and in this country, it cannot be recommended, even for use in colleges, because it is quite antiquated, no conscientious attempt having been made to incorporate in it genuine recent and important acquisitions to our knowledge of the subject.

Midwifery for Nurses. By Douglas Miller, M.D., F.R.C.S., F.R.C.P., Physician, Edinburgh Royal Maternity and Simpson Memorial Hospital. Cloth. Price, $2.40. Pp. 256, with 39 illustrations. New York: Longmans, Green & Company; London: Edward Arnold & Company, 1931.

This is an exceptionally well prepared handbook. The subject matter is well proportioned, the language is simple and clearly written and the glossary is ample. The chapter on anatomy is adapted to the level of the readers for whom it is intended, omitting unnecessary detail. The illustration and description of fetal circulation and a careful description of the fetal skull with illustrations and all the measurements could have been condensed materially and with advantage. Signs, symptoms and management of pregnancy are well presented. In a book written for instruction of nurses who are to conduct deliveries in the home, it is of especial interest to note that lateral delivery retains its position of first choice in British obstetrics. The described technic and illustrations are precise and good. The author limits care of the infants' eyes in home deliveries to wiping of the lids, reserving active prophylaxis for infants whose mothers have a discharge, yet he considers chemical prophylaxis a routine measure for hospital cases. This distinction is certainly to be decried as dangerous teaching. Control of postpartum hemorrhage after the uterus is empty includes an intra-uterine antiseptic douche at from 118 to 120 F., which is repeated after manual compression of the uterus between the fist in the uterus and the hand on the abdomen. Surely a uterine pack, if permissible in the emergency, would be safer than all this manipulation and douching.

A Mind That Was Different. By Dow Thompson. With an introduction by M. V. O'Shea, Professor of Education, the University of Wisconsin. Cloth. Price, $2. Pp. 117. Oklahoma City: Harlow Publishing Company, 1931.

This volume includes a depiction of the attempt of the introvert to adjust himself to his environment. It is based on personal experience and is largely biographic. The author is firmly convinced of the soundness of the classification of all mankind into introverts and extroverts. He believes that in practically all instances marriages occur between opposites, from this point of view. Indeed, he believes that the balance of civilization is apparently maintained by association of such opposites in many ways. The introvert type, he believes, is far more common than the extrovert, and he includes professional workers particularly in the introvert group. He even has a conception as to the nature of the healing of disease. The volume is interesting as a psychologic document.

Handbuch der normalen und pathologischen Physiologie mit Berücksichtigung der experimentellen Pharmakologie. Herausgegeben von A. Bethe, G. v. Bergmann, G. Embden und A. Ellinger. Band 12, 2.Hälfte: Receptionsorgane II. Teil 2, Photoreceptoren. Bearbeitet von M. Bartels, M. Baurmann, A. Bielschowsky, usw. Paper. Price, 102 marks. Pp. 745-1611, with 276 illustrations. Berlin: Julius Springer, 1931.

The present volume contains chapters on visual acuity, pharmacology of vision, movements of the eyes, heterophorias and strabismus, comparative physiology of eye movements, perception of movement, protective apparatuses of the eye, the water metabolism of the eye (aqueous humor), electrical phenomena in the eye, ocular adaptation to darkness and to light, and visual disturbances of general and local origin in parts elsewhere in the animal economy. It is obvious that every scientific ophthalmologist will want this book, which completes volume XII. The first half of the volume, on photoreceptors, was reviewed in THE JOURNAL, Jan. 4, 1930, page 56. The teacher and the research worker in this field will be particularly pleased to have this useful teaching and working tool.

Encephalitis Lethargica, Its Sequelae and Treatment. By Constantin von Economo, Professor of Psychiatry and Neurology in the University of Vienna. Translated and adapted by K. O. Newman, M.D., Pathologist to the Oxford County and City Mental Hospital, Oxford. Cloth. Price, $6. Pp. 200, with 21 illustrations. New York: Oxford University Press, 1931.

In testimony of the exellence of this volume, little more is needed than the name of its author. To von Economo belongs the credit for the recognition of epidemic encephalitis as a disease entity, and his subsequent works on the subject are now historical, in spite of the brief period that has elapsed. The book gives an admirable account of all phases of the disease, in both its acute and its chronic forms, and though there is some dogmatism there are extensive references to the work of others: a bibliographic tabulation covers nearly twenty pages. The literature on this disease is so large, however, that even this does not nearly cover the field, and there is, as the translator points out, a natural preference for European writers and some neglect of American authors, which is not due to failure to appreciate the merits of their work. There is also an excellent review of the enormous influence that the manifestations and pathology of this disease have had on neurologic and psychiatric concepts. Dr. Newman is to be congratulated on the quality of the translation, which makes easy reading. The book can be heartily recommended and is an admirable culmination of the work of its author.

Medicolegal

Tuberculosis Attributed to Inhalation of Hydrogen Sulphide

(Barron v. Texas Employers' Ins. Assn. (Texas), 36 S. W. (2d) 464)

Barron was employed in the Crane County oil field, and the gas emitted from the producing wells among which he worked was poisonous. Several times during the few months that Barron worked there his eyes were inflamed, and on one occasion he was almost overcome, when gaging an oil tank, by the fumes arising from the oil. From these injuries, however, he had fully recovered before the injury occurred for which he claimed compensation. At the time of that injury he was lowering tubing into an oil well, and because he was operating the machinery controlling the lowering of the pipe he was unable to avoid inhaling the gas by temporarily abandoning his work, as other employees did. On this account, he was compelled to inhale large quantities of heavy discharges of gas, March 9 and 10, 1928. As the result of this severe, heavy and unusual gassing, Barron was compelled to quit work on the afternoon of March 10. He attempted to work the following day, but his condition grew gradually worse and active tuberculosis set in, with a hemorrhage some three weeks after the accident. The industrial accident board made an award in Barron's favor. A jury in the district court, to which the insurer appealed, found on special issues that the injury sustained by Barron was not the result of his inhaling hydrogen sulphide in small quantities over a period of months but resulted from inhaling that gas in unusually heavy quantities, March 9 and 10, and the award of the board was affirmed. On appeal to the court of civil appeals, eighth supreme judicial circuit, however, the judgment of the district court was reversed, and judgment rendered in favor of the insurer.[1] From this judgment, Barron appealed to the commission of appeals, section B.

By medical testimony it was shown that the gas of the wells in the Crane County field causes an irritation of the mucous membrane and lungs and weakens the system so as to bring about tuberculosis when the tubercle bacillus happens to be present at the time of the injury, or during the period in which the inflamed condition of the lungs continues. The inhalation of the gas itself does not cause tuberculosis, but it weakens the victim to such an extent that he is peculiarly susceptible to the development of the disease if the germ is present. The insurer contended, however, that Barron's condition was due to an occupational disease, as distinguished from "accidental damage or harm to the physical structure of his body and such disease or infection as naturally result therefrom," and that therefore he had not sustained an accidental injury within the purview of the workmen's compensation act of Texas.

A disease, said the commission of appeals, acquired in the usual and ordinary course of an employment, which from common experience is recognized to be incidental thereto, is an occupational disease and not within the contemplation of the workmen's compensation act. An injury resulting from accident is something which occurs unexpectedly and not in the natural course of events; it is one which may possibly be pre-

1. 21 S. W. (2d) 78; J. A. M. A. **95**:70 (July 5) 1930.

vented by the exercise of due care and caution on the part of the employer. A distinguishing characteristic of an accidental injury is that it can always be traced to a definite time, place and cause. The term "occupational disease" must be restricted to diseases that are the usual and ordinary result incident to the pursuit of an occupation, which must in the nature of things be the result of a slow and gradual development. Tested by these rules, said the commission of appeals, it fairly appears that Barron's condition was due to an accidental injury and not to an occupational disease, for two reasons: First, because the volume of the gas which came from the well when he sustained his injury was an unusually heavy one and the serious consequences from inhaling such gas are traceable definitely to that particular gassing and not to the slow and gradual process of inhaling gas during the time he was employed in the oil field. Second, because Barron's employer could have prevented the escape of such a heavy volume of gas by the exercise of proper care and caution. An employer who fails in his duty to furnish a safe place for his employees to work cannot avoid liability by calling such an injury as may result from his neglect an occupational disease. He can avail himself of the defense that his employee's injury resulted from an occupational disease only when he has used due diligence to prevent his employee from being subjected to hazards calculated to injure while engaged in his service. The law recognizes that there are some occupations fraught with inherent dangers, even though the employer has used proper care and diligence to safeguard and protect those employed by him. Where the requisite degree of care has been used by the employer, and the employee is injured by a gradual and slow process resulting from the hazards necessarily incident to the performance of his duty, then the injury is treated as an occupational disease. A disease contracted as the direct result of unusual conditions connected with employment, and not as an ordinary result of pursuing that employment, should be considered as an accidental injury.

The commission of appeals recommended, therefore, that the judgment of the court of civil appeals in favor of the insurer be reversed and the award in favor of Barron be affirmed. The recommendation of the commission was approved by the Supreme Court of Texas.

Compensation of Physicians: Liability of Husband.—The common-law duty of a husband to support his wife has not been changed by legislation relating to married women; he is still liable for necessaries furnished her. He is relieved of his liability only when he has offered to supply his wife with such necessaries or to provide her with sufficient funds for the same, or when the party furnishing the necessaries, either by express agreement or by unmistakable conduct, limits himself to the wife's credit. These, however, are matters of defense, to be proved by the husband. The husband of a patient for whom the plaintiff had done certain dental work, the husband being the defendant in this case, contended that his wife claimed that the plaintiff's work was worthless. He contended further that since the plaintiff had brought his action against him, the husband, the wife was thereby prevented from interposing a counterclaim for the return of such money as had been paid to the plaintiff or for damages because of the plaintiff's malpractice, and since he, the husband, had paid no money to the plaintiff, there was no basis on which he himself could interpose a counterclaim in the pending action. This contention, said the municipal court of the city of New York, borough of Manhattan, first district, is without force. If, by reason of the defective work done, there has been a total failure of consideration, the right to a return of the money paid is in either the husband or the wife. If, as counsel for the defendant-husband contended, the right was vested in the wife alone, she might institute an independent action to recover the money. It is illogical, said the court, to urge that she, not the husband, must be sued, merely to afford her an opportunity to set forth her rights in a counterclaim. Whoever may be entitled to a return of the money has an adequate remedy: If the right is in the husband, he can exercise that right by way of a counterclaim; if it is in the wife, she can exercise it in her own separate action. Judgment was rendered for the plaintiff-dentist.—*Jackson v. Frey (N. Y.), 248 N. Y. S. 669.*

Insurance, Health: Chiropractor Not a "Licensed Physician or Surgeon."—The plaintiff, a chiropractor, was insured by the Great Northern Life Insurance Company under a life and health insurance policy. Under it, payment for disability by reason of bodily disease was contingent on the insured's being under the professional care and regular attendance of a licensed physician or surgeon other than the insured himself. The plaintiff consulted another chiropractor, who advised him that he needed a complete rest and change. Thereupon the plaintiff went to Texas and remained there during the winter, consulting no one about his health during his absence. On his return, he filed claim for the payment of indemnity to cover the period of his absence in the South. On payment being refused, he brought suit. The trial court directed a judgment in favor of the insurer. Thereupon the plaintiff appealed to the Supreme Court of Michigan. The law under which both the plaintiff and his chiropractic attendant were licensed to practice chiropractic in Michigan expressly provides that a practitioner licensed under it shall not be permitted to use in any form the title of "Doctor" or "Professor" or any of their abbreviations, or any other sign or appellation to his name which would in any way designate him as a physician or surgeon qualified as such under the provisions of the act. Subsection 3 of section 6726, C. L. 1915. Moreover, the legislature subsequently, in another act, but referring to the act cited above, defined the terms "physicians" and "surgeons" as meaning such persons as are licensed to full and unlimited privileges to practice medicine and surgery and not to persons licensed to practice a system of limited treatment of human ailments or diseases. Section 12, Act 407, Public Acts, 1927. If there were any doubt in regard to the plain meaning of the term "licensed physicians and surgeons," they would be dispelled by these statutory provisions. A chiropractor may practice medicine, but in doing so he does not become a licensed doctor, physician or surgeon in the state of Michigan. The judgment in favor of the insurer was affirmed.—*Erdman v. Great Northern Life Ins. Co. (Mich.), 235 N. W. 260.*

Workmen's Compensation Acts: Silicosis Followed by Tuberculosis Not Compensable.—An employee was engaged in a closed room, operating an air hose through which sand was blown on the face of marble for the purpose of wearing off the marble, thereby creating a considerable amount of sand and marble dust in the room. Because of faulty construction and adjustment of the mask which he wore, and of the insufficient ventilation of the room, he was not prevented from inhaling particles of sand and dust. The particles which he inhaled caused him to contract silicosis, which resulted in tuberculosis of the lungs. These diseases, said the court of appeals of Georgia, division No. 2, so far as they resulted from the causes indicated, did not result from any previous injury or accident to the employee which arose out of and in the course of his employment. Since an "injury," as defined in the Workmen's Compensation Act of Georgia, is "an injury by accident," in the sense of some damage or hurt to the employee, the mere lodging of the particles of dust and sand in the defendant's lungs constituted in itself no injury or accident to the employee in the sense of the act, other than the resulting disease itself, and for this reason the resultant diseases were not caused by any injury or accident to the employee. The industrial commission was authorized to deny compensation, and the judge of the superior court did not err in affirming its denial.—*Simmons v. Etowah Monument Co. (Ga.), 157 S. E. 260.*

Society Proceedings

COMING MEETINGS

Annual Congress on Medical Education, Medical Licensure and Hospitals, Chicago, February 15-16. Dr. William D. Cutter, Secretary, Council on Medical Education and Hospitals, 535 North Dearborn St., Chicago.

Mid-South Post-Graduate Medical Association, Memphis, Tenn., February 9-12. Dr. A. F. Cooper, Bank of Commerce Building, Memphis, Secretary.

Pacific Coast Surgical Association, Coronado, Calif., February 25-27. Dr. E. L. Gilcreest, 384 Post St., San Francisco, Secretary.

Current Medical Literature

AMERICAN

The Association library lends periodicals to Fellows of the Association and to individual subscribers to THE JOURNAL in continental United States and Canada for a period of three days. Issues of periodicals are kept on file for a period of five years only. Requests for issues of earlier date cannot be filled. Requests should be accompanied by stamps to cover postage (6 cents if one and 12 cents if two periodicals are requested). Periodicals published by the American Medical Association are not available for lending, but may be supplied on purchase order. Reprints as a rule are the property of authors and can be obtained for permanent possession only from them.

Titles marked with an asterisk (*) are abstracted below.

Alabama Medical Association Journal, Montgomery

1: 185-232 (Nov.) 1931

Some Problems of Medical Ethics. O. West, Chicago.—p. 185.
Tularemia of Eye: Case. T. F. Huey, Anniston.—p. 190.
Constipation in Childhood. R. Parker, Montgomery.—p. 191.
Deep Seated Diverticula of Esophagus. M. B. Carter, Birmingham.—p. 193.
Effect on Toxicity of Tetanus Toxin of Withholding Water from Diet. E. B. Carmichael, University.—p. 195.
Age of Syphilis. W. E. Wilson, Montgomery.—p. 200.
Recent Progress in Pediatrics. C. L. Lamar, Birmingham.—p. 205.
Screening as Weapon Against Malaria. D. G. Gill, Montgomery.—p. 210.

American Journal of Hygiene, Baltimore

14: 515-737 (Nov.) 1931

Intestinal Carriers of Clostridium Tetani and Immunity: Tetanus IX. G. E. Coleman, San Francisco.—p. 515.
Study of Immunization with Bacterial Bodies Against Tetanus: Tetanus VIII. G. E. Coleman and Janet B. Gunnison, San Francisco.—p. 526.
*Hypersensitivity to Bacterial Proteins and Its Rôle in Susceptibility and Immunity. W. B. Wherry, Cincinnati.—p. 539.
Antitoxic Immunity to Diphtheria in Relation to Tonsillectomy. R. E. Wheeler, J. A. Doull and W. H. Frost, Baltimore.—p. 555.
Quantitative and Statistical Analyses of Infections with Eimeria Tenella in Chicken. F. Fish, Baltimore.—p. 560.
Studies on Diversity of Strains in Giardia Canis (Hegner, 1922) and Their Biologic Variations as Affected by Diet. H. Tsuchiya, St. Louis.—p. 577.
*Occurrence of Bact. Tularense in Eastern Wood Tick, Dermacentor Variabilis. R. G. Green, Minneapolis.—p. 600.
Studies on Host-Parasite Relationships of Dirofilaria Immitis Leidy and Its Culicine Intermediate Hosts. S. M. K. Hu, Baltimore.—p. 614.
*Meningococcus Meningitis: Results of Recent Investigation in Relation to Serum Therapy. A. Wadsworth, Albany, N. Y.—p. 630.
Studies on Ascaris Lumbricoides and Trichuris Trichiura in China. W. W. Cort and N. R. Stoll, Baltimore.—p. 655.
Studies on Malaria in Venezuela. E. I. Benarroch, Caracas, Venezuela.—p. 690.
Viability of Pathogenic Fungus on Wool Cloth. A. G. Gould and Edna K. Carter, Ithaca, N. Y.—p. 694.
Comparison of Viability of Ova of Broad Fish Tapeworm, Diphyllobothrium Latum, from Man and Dogs: Its Bearing on Spread of Infestation with This Parasite. H. E. Essex and T. B. Magath, Rochester, Minn.—p. 698.
Observations on Hookworm Disease in Costa Rica, Based on Postmortem Findings. L. Schapiro and E. G. Nauck, Newark, N. J.—p. 705.
Further Attempts to Transmit Yellow Fever with Mosquitoes of South America. N. C. Davis and R. C. Shannon, Bahia, Brazil.—p. 715.
Stability of Calcium in Saliva and Blood. Muriel Fetterly and G. H. Maughan, Ithaca, N. Y.—p. 723.
Comparison of Chemical Methods Used to Separate Larvae of Hookworm of Man and Animals from Larvae of Free Living Nematodes. P. H. van Thiel and A. E. Wolff.—p. 726.

Hypersensitivity to Bacterial Proteins.—According to Wherry, bacteria are potential parasites if they can produce poisons that will hydrate the tissues of an animal, thus putting the food substances into solution. Some of the poisons produced might be amines. The fact that bacteria contain poisons capable of hydrating tissues may be determined by the intradermal inoculation of the bacteria, extracts of bacteria or their toxins, or by immersing tissues in toxins in the presence of free water. A state of hypersensitivity to bacterial toxins, extracts or the heat-killed bacteria may be determined by the intradermal test. Such tests have shown that human beings suffering from many infections including asthma, acute and chronic sinusitis, colds, urticaria, angioneurotic edema, spastic and mucous colitis and chronic arthritis are hypersensitive to bacterial proteins. These cases can be relieved by desensitization, and this is best brought about by partially detoxicated antigens. Amines and foreign proteins pass the mucosa best in an alkaline medium. Cases showing intoxication or sensitization to proteins derived from the colon give evidence of putrefaction taking place in an alkaline medium. The saccharolytic colonic flora is suppressed in these cases and the symptoms may be relieved by feeding lactose. Keeping the contents of the colon in an acid state should guard against the development of such types of hypersensitivity.

Bacterium Tularense in Wood Tick.—Green isolated Bacterium tularense directly from the eastern wood tick, Dermacentor variabilis, by guinea-pig inoculation and subsequent culture. Over an area of 20 square miles in central Minnesota the incidence of wood tick infection was found to be less than 0.1 per cent during the summer of 1930. The animal culture derived from ticks was of low virulence as indicated by the type of lesion produced and by failure consistently to produce fatal infections in rabbits.

Meningococcus Meningitis.—Wadsworth believes that the specific serum therapy of meningococcus meningitis, as of all the infectious diseases, depends on early and adequate treatment, on the one hand, and, on the other, on the severity of the infection. In many of the acute fulminating cases the patients die, irrespective of serum therapy. The bacteremia that occurs in these cases is not necessarily an indication of the severity of the infection, since it occurs also in the prolonged cases and in those in which the patients recover. After all, from the practical standpoint of serum therapy, the character and extent of the cerebrospinal processes determine the course of the disease in the majority of the cases. Intraspinal or intracisternal injection of the serum is therefore of first importance but it may well be supplemented and aided by intravenous administration during the early stages of treatment. The preparation and standardization of antimeningococcus serum of the highest potency and valence have been beset with many difficulties. The strains of the meningococcus differ in their classification and vary widely in their immunologic activities. The methods of standardization have not been adequate. The agglutinative titer has been the most satisfactory indication of the extent of the immune process and is the only test by which the valence of the serum can be determined. Since it is impracticable to use monovalent serums, it is important to be certain that the polyvalent serums have the broadest valence and highest potency. The agglutinative titer of a serum with a freshly isolated meningococcus is not a reliable criterion of its therapeutic value because these strains often do not agglutinate well until they have been under cultivation for some time. The attempt to broaden a serum by adding strains which do not agglutinate in it will ultimately sacrifice both potency and valence. It is only by selecting the most representative and antigenic strains of the meningococcus and by limiting the number of such strains that serums of the highest potency and valence can be obtained.

American J. Medical Sciences, Philadelphia

182: 597-740 (Nov.) 1931

Effect of Pyrodin Poisoning on Blood and Hemolytopoietic System: With Especial Reference to Formation of Heinz-Ehrlich Bodies in Vivo and Vitro. F. G. Bratley, H. H. Burroughs, D. M. Hamilton and C. Kern, Philadelphia.—p. 597.
*Influence of Ultraviolet Light on Plasma Clot Formation. J. P. M. Vogelaar and W. B. Wartman, Philadelphia.—p. 605.
Blood Sugar Response to Epinephrine in Thyroid-Fed Animals. A. J. Abbott and F. W. van Buskirk, Philadelphia.—p. 610.
*Variations in Pancreatic Ducts and Minor Duodenal Papilla. S. Simkins, Philadelphia.—p. 626.
Pathogenesis of Acute Suppurative Parotitis: Experimental Study. A. L. Berndt, R. Buck and R. von L. Buxton, Philadelphia.—p. 639.
*Acute Suppurative Parotitis: Pathologic and Bibliographic Study with Report of Two Cases. R. P. Custer, Philadelphia.—p. 649.
Case of Diabetes Mellitus and Fatty Diarrhea Due to Carcinoma of Pancreas: Treatment with Very High Carbohydrate Diet and Insulin. T. van Orden Urmy, C. M. Jones and Josephine Colburn Wood, Boston.—p. 662.
Jerusalem Artichokes and Liver in Treatment of Diabetes Mellitus. S. Soskin, H. F. Binswanger and S. Strouse, Chicago.—p. 675.
Rôle of Streptococcus in Arthritis Deformans: Improved Cultural Method. J. W. Gray and C. H. Gowen, Newark, N. J.—p. 682.
Study of 503 Cases of Pulmonary Tuberculosis with Indefinite or No Usual Abnormal Physical Signs. L. Brown, Saranac Lake, N. Y.—p. 700.

Influence of Ultraviolet Rays on Plasma Clot Formation.—According to Vogelaar and Wartman, there is a gradual increase in the transparency of a clot formed by adding calcium chloride solution to citrated blood plasma which has been irradi-

ated with ultraviolet rays from one to four hours. These changes were demonstrated both macroscopically and microscopically. The suggestion is made that they are due to an imbibition of water by the fibrinogen when it forms fibrin. This process results in an alteration of the index of refraction of the different parts of the system with a consequent effect on the transparency of the system.

Pancreatic Ducts and Minor Duodenal Papilla.—Simkins gives a detailed description of the relationships of the duct of Santorini to the duct of Wirsung. A classification is offered of the various arrangements found, as well as a theory to account for such variations. The extraordinary variability of the pancreas in respect to size, shape and ductal arrangement is pointed out. The author confirmed Opie's observation that in 10 per cent of individuals the duct of Santorini is functionally as well as structurally the chief outlet of the external pancreatic secretion, and that such an anomalous arrangement may play an important part in the prevention or institution of acute hemorrhagic pancreatitis; that it is of great importance likewise in the etiology of chronic interlobular pancreatitis, and that this condition may account for certain puzzling cases of unexplained deaths.

Acute Suppurative Parotitis.—Custer states that acute suppurative parotitis occurs as a complicating and often terminal infection in a wide variety of conditions. Most observers have considered the infection to be ductogenous in the vast majority of cases, though a frequent hematogenous origin is maintained by some. Evidence in favor of each of these views is presented. Two cases of acute suppurative parotitis are reported in which the evidence favors ascending infection.

American J. Obstetrics & Gynecology, St. Louis

22: 661-816 (Nov.) 1931

*Regeneration of Uterine Mucosa After Delivery, with Especial Reference to Placental Site. J. W. Williams, Baltimore.—p. 664.

Pathology of Some Special Ovarian Tumors and Their Relation to Sex Characteristics. R. Meyer, Berlin, Germany.—p. 697.

Significance of Incomplete Fusion of Müllerian Ducts in Pregnancy and Parturition, with Report on Thirty-Five Cases. F. R. Smith, New York.—p. 714.

Abortion in Relation to Fetal and Maternal Welfare. F. J. Taussig, St. Louis.—p. 729.

Reconstruction of Urethra and Vesical Sphincter by Employing Levator Ani Muscles. M. Douglass, Cleveland.—p. 739.

Responsibility of Medical Profession in Mortality from Childbearing. G. W. Kosmak, New York.—p. 748.

*Nature of Urinary Protein in Eclampsia. N. J. Eastman, Baltimore. —p. 756.

Simple Technic for Cesarean Section Under Local Infiltration Anesthesia. H. C. Williamson, New York.—p. 761.

Nupercaine Subdurally in Obstetrics. S. A. Cosgrove, Jersey City, N. J. —p. 763.

*Sarcoma of Uterus. L. P. Kasman, Brooklyn.—p. 767.

Normal Pregnancy in Patient with Preexisting Complete Heart Block. R. S. Titus and W. B. Stevens, Boston.—p. 773.

Two Years' Résumé of Abortions in Louisville City Hospital. W. O. Johnson, Louisville, Ky.—p. 778.

Baldwin Modification of Jarcho Pressometer for Transuterine Insufflation, Pneumoperitoneum and Uterosalpingostomy. L. G. Baldwin, Pasadena, Calif.—p 783.

Regeneration of Uterine Mucosa After Delivery.—Williams outlines the fate of the placental site in the normal puerperal woman. From six to seven weeks is required for its disappearance, and it is not effected by absorption in situ but rather by a process of exfoliation which is in great part brought about by the undermining of the placental site by the growth of endometrial tissue. This is effected in part by extension and downgrowth of endometrium from the margins of the placental site and partly by the development of endometrial tissue from the glands and stroma left in the depths of the decidua basalis after separation of the placenta. In general, more importance should be attached to the former than to the latter mechanism, for the reason that in many instances the base of the placental site extends beyond the limits of the original basalis so that obliterated arteries and thrombosed veins may lie in the inner layer of the muscularis and consequently must be extruded before an entirely normal endometrium can be degenerated. In this event, the endometrial tissue derived from fragments of the basalis would lie internal to such vessels, so that it would seem that the only method by which endometrium could come to lie external to them would be by some such process of invasion and undermining. Considered from another point of view, such a process of exfoliation should be regarded as very conservative and as a wise provision on the part of nature; otherwise great difficulty might be experienced in getting rid of the obliterated arteries and organized thrombi, which if they remained in situ would soon convert a considerable part of the mucosa into a mass of scar tissue, with the result that after a few pregnancies it would no longer be possible for it to go through its usual cycle of changes, and the reproductive career would come to an untimely end. Moreover, in a certain way, this mechanism of exfoliation is suggestive of the life history of the corpus luteum, which, leaving out of consideration its internal secretory function, appears to have as one of its objects the prevention of the undue formation of scar tissue in the ovary.

Nature of Urinary Protein in Eclampsia.—According to Eastman the urinary protein excreted in eclampsia is characterized by an extremely high globulin content, the urinary albumin: globulin ratio in this disease averaging about 3. In nephritis and nephrosis complicated by pregnancy the urinary albumin: globulin ratios are higher, averaging in the author's series 6.7 for nephritis and 13.3 for nephrosis. It is suggested that the high globulin content of the urine in eclampsia is a direct result of the increased capillary permeability associated with that disease.

Sarcoma of Uterus.—Kasman reports four cases of uterine sarcoma, one of which was a primary intramural sarcoma, perforating into the abdominal cavity and causing internal hemorrhage. The other three cases showed gradations of sarcomatous degeneration of fibromyoma. Emphasis is laid on the relative frequency and importance of sarcomatous degeneration in uterine fibromyomas.

Archives of Internal Medicine, Chicago

48: 721-906 (Nov.) 1931. Part I

Causation and Prevention of Congenital Heart Disease. W. D. Reid, Boston.—p. 721.

*Tuberculosis in Medical and College Students. H. W. Hetherington, F. M. McPhedran, H. R. M. Landis and E. L. Opie, Philadelphia. —p. 734.

Infective Neuronitis: Report of Case with Autopsy Observations. H. G. Jacobi, New York.—p. 764.

*Cutaneous Histamine Reaction as Test for Collateral Circulation in Extremities. G. de Takáts, Chicago.—p. 769.

Intestinal Oxygenation in Idiopathic Ulcerative Colitis. J. Felsen, New York.—p. 786.

Agranulocythemia: Report of Case with Complete Antemortem and Postmortem Records. C. V. Richards, Baltimore.—p. 793.

*Dextrose Level of Arterial and Venous Blood in Arthritis. R. M. Stecher and H. J. Jeghers, Cleveland.—p. 801.

Determination of Plasma Volume: I. Dye Method. S. Graff and H. T. Clarke, New York.—p. 808.

Determination of Plasma Volume: II. Rate of Dye Mixing. S. Graff, D. A. D'Esopo and A. J. B. Tillman, New York.—p. 821.

*Blood Amylase in Relation to Disease of Pancreas. R. Elman, St. Louis. —p. 828.

*I. Goldstein's Heredofamilial Angiomatosis with Recurring Familial Hemorrhages (Rendu-Osler-Weber's Disease). H. I. Goldstein, Camden, N. J.—p. 836.

Isolated Congenital Dextrocardia: Report of Two Cases with Unusual Electrocardiographic Findings; Anatomic, Clinical, Roentgenologic and Electrocardiographic Studies of Cases Reported in Literature. S. S. Lichtman, New York.—p. 866.

Tuberculosis in Students.—Hetherington and his associates made examinations to discover the frequency of tuberculous infection in 279 premedical college students and in 452 medical students and compared them with similar examinations of boys attending high school. It was noted that tuberculous infection indicated by the tuberculin test increased with age, occurring in 77.8 per cent of the high school boys, in great part between the ages of 15 and 18 years, in 85.6 per cent of the premedical college students, largely between the ages of 16 and 21 years, and in 93.6 per cent of the medical students, largely between the ages of 21 and 26 years. The frequency of recognizable calcified nodules in the lungs and lymph nodes did not differ notably in high school boys, in premedical college students and in medical students. Tuberculous infiltrations at the apex of the lungs were somewhat more frequent in premedical students than in high school boys and had not increased notably in students of the first year of medicine (4.1 per cent). In medical students they increased rapidly from year to year, being 11.6 per cent in second year students, 14 per cent in third year students and 20.5 per cent in fourth year students.

Moreover, the frequency of advanced lesions increased at the same time, thirteen students in the fourth year having lesions extending from the apex below the clavicle. Tuberculous infiltrations of the apex of the lungs accompanied by symptoms or physical signs, that is, manifest pulmonary tuberculosis, occurred once among the premedical students examined, once during the first two years of medicine, four times in the third year class in medicine and nine times in the fourth year class. An increasing frequency of grave infection during adolescence and early adult life is evident, but there are available no comparable data concerning the occurrence of tuberculosis in young men pursuing other occupations and presumably in good health. Nevertheless, the high incidence of apical lesions in these medical students, increasing rapidly from the ages of 21 to 26, indicates that they were peculiarly subject to advanced tuberculous infection.

Cutaneous Histamine Reaction.—De Takáts states that with a dilute solution of histamine, intradermal wheals produce a distinct arterial flare. This simple clinical test may be used to determine the presence or inadequacy of the cutaneous collateral circulation. Together with palpable changes in the pulse and the temperature of the skin, it affords an estimate of circulatory efficiency of the extremities, provided a few confusing factors are excluded.

Arthritis.—Stecher and Jeghers describe a practical method for the determination of arterial dextrose levels and record observations of dextrose tolerance tests in arthritic patients and in controls, made on venous and arterial blood. They demonstrated decreased and delayed removal of sugar from the blood of arthritic patients. This seems best explained on the basis of a decreased capillary function in the peripheral circulation.

Blood Amylase in Pancreatic Disease.—Elman reports twenty cases in which the blood amylase was studied. In fourteen, anatomic observations of the pancreas were made, in nine cases by operation (including a biopsy in two), and in five by necropsy. With one exception, the results of the study confirmed his previous observations; i. e., a normal blood amylase was found when the acini of the gland were normal; deviations from this normal value, either increase or decrease, were noted when the acini or ducts were diseased. Critical analysis of the observations as to the practical value of the study of blood amylase in the diagnosis of pancreatic disease indicates its usefulness in several aspects. In one case the high amylase value added significant weight to the indications for operation, which the finding of an acute pancreatitis justified. In another case the value of the blood amylase was not utilized as an indication for operation, which if performed might have saved the patient's life. In a case of pancreatic cyst the marked increase in blood amylase proved an important aid in the diagnosis and in the indications for operation. In a recently observed case the symptoms of acute disease of the upper portion of the abdomen were so marked that pancreatic necrosis was suspected and operation was planned; the blood amylase, however, was normal. Operation was not performed, and the subsequent development with recovery of the patient pointed rather to coronary disease as the probable cause of the symptoms. In the chronic cases, in general, the deviations from the normal blood amylase have been less striking and the usefulness of this indication has been less marked. In patients with painless jaundice the blood amylase may prove to be of importance in judging the probable value of a laparotomy. When carcinoma of the pancreas is present, a cholecystogastrostomy can frequently be done with at least temporary amelioration of symptoms. In those few cases in which the tumor is really not carcinoma but is due to inflammatory enlargement, the operation may result in a cure. When the tumor has not involved the common bile duct and there is no jaundice, the blood amylase may be the only objective evidence of disease of the pancreas.

Heredofamilial Angiomatosis.—According to Goldstein there are on record in the entire available medical literature of the world about 90 or 95 families and about 500 or 550 persons with Rendu-Osler-Weber's disease. This condition is a definite clinical entity and has been recognized as such for nearly thirty-five years. It may occur with variations as to hemorrhages and telangiectasias. However, epistaxis of the familial type and the occurrence of multiple hemorrhagic (hereditary) telangiectasias on the face, in the nasal septum and in the mouth are the most common manifestations. In the later stages of this disease, the spleen may be enlarged. Heredity, hemorrhage and telangiectasia are the three cardinal points for diagnosis. Reported instances of "familial epistaxis" (with or without telangiectasia), "familial hemoptysis," "familial hematuria," "familial gastrostaxis" and familial (hereditary) telangiectasia are different forms of Rendu-Osler-Weber's disease or Goldstein's heredofamilial angiomatosis with recurring familial hemorrhages. This condition is not sex bound; it occurs in both sexes and is transmitted by both sexes. The coagulation of the blood and the bleeding time, the blood platelets, blood calcium and fragility of the red blood cells are normal. Secondary anemia of greater or less degree may be present. Kinetocytes (Edelmann) in the blood of these patients have not yet been studied. They were greatly increased in thrombopenic purpura in the case of a young woman whom the author studied with Edelmann in Vienna. Atavism (Fitz-Hugh and others) is a factor in the heredity of this disease. As the condition is one of heredity and is due to congenital weakness and defect of the blood vessel system, no cure is possible. Treatment is possible only for the hemorrhages, the approachable bleeding points and the secondary anemia. Transfusions of blood and the use of radium and roentgen rays over the spleen and the bleeding areas may be tried, together with local measures, such as cautery and styptics. Liver, parathyroid extract, calcium, iron and arsenic have been used.

Archives of Ophthalmology, Chicago

6: 647-816 (Nov.) 1931

Aqueous Humor in Glaucoma. A. Magitot, Paris, France.—p. 647.
Blue Arcs of Retina. B. Friedman, New York.—p. 663.
*Experiences with Gonin Operation. M. J. Schoenberg, New York.—p. 675.
Checking Standard for Tonometers. C. E. Ferree and G. Rand, Baltimore.—p. 689.
Intrascleral Nerve Loops. A. B. Reese, New York.—p. 698.
Epipapillary Tissues. B. Samuels, New York.—p. 704.
*Congenital Absence of Lacrimal Puncta and of Canaliculi. E. L. Goar, Houston, Texas.—p. 724.
Exophthalmos in Infantile Scurvy. J. H. Dunnington, New York.—p. 731.
Cytologic Studies on Retina: I. Normal Coexistence of Oligodendroglia and Myelinated Nerve Fibers. M. L. Berliner, New York.—p. 740.

Gonin Operation.—Schoenberg believes that the Gonin method of treatment for retinal detachments is and will remain on probation for a considerable length of time. In the selected cases this method gives surprisingly good results. The two main difficulties to be mastered thoroughly by the surgeon undertaking to apply this method are the selection of the proper cases and the carrying out of the proper technic. Early operation increases the chance of recovery. Securing beforehand the patient's cooperation and his determination to go through the lengthy treatment is essential.

Absence of Puncta and Canaliculi.—Goar reports the case of a woman, aged 22, in whom there was a complete absence of the lacrimal puncta and papillae of the left side, and a thorough search for the lower canaliculus did not reveal any. There was a history of epiphora in the patient after she applied herself to continuous use of her eyes, when it became very annoying. To correct this an operation was performed. A needle was passed through the semilunar fold into the region of the lacrimal sac, and fluid was injected. The solution came promptly into the nose, showing that a sac was present and that the duct was patent. After infiltration with 2 per cent procaine hydrochloride, a vertical incision was made through the semilunar fold behind the caruncle, and the dissection was carried through the lateral wall of the sac. A large probe was passed through the opening into the nose. Two days later a metal style, with the head bent at right angles to the shaft, was introduced. The style was loosened every few days and was left in place for ten weeks. After removal of the style, granulations that appeared at the orifice were destroyed two or three times with the cautery. Large Bowman probes were passed twice a week for a month; then the intervals between probings were gradually lengthened. The patient reports about once in three months for observation. A number 8 Bowman probe slips readily into the orifice, which is in a smooth funnel-shaped depression immediately behind the caruncle. Fluids instilled

into the eye pass readily into the nose. There is no more epiphora. The artificial canal has apparently epithelialized; after nearly two years it is justifiable to report a cure. The technic of the operation is so simple and the results are so satisfactory that the author wishes to place the case on record so that other ophthalmologists confronted by a similar condition may have the benefit of his experience.

Arch. of Physical Therapy, X-Ray, Radium, Chicago

12: 645-700 (Nov.) 1931

Energy Distribution in Irradiation of Human Body with Ultraviolet Rays from Various Artificial Sources. J. S. Hibben, Pasadena, Calif.—p. 645.
Physiologic Background of Muscle Reeducation. A. Steindler, Iowa City.—p. 655.
*Treatment of Sciatica by Physical Measures. N. E. Titus, New York.—p. 662.
Antiphlogistic Action of Infra-Red Rays. G. J. Warnshuis, Cedarburg, Wis.—p. 665.
Consideration of Some Forms of Physical Therapy in Otolaryngology. G. B. Rice, Boston.—p. 668.
Treatment of Deafness by Zund-Burguet Electrophonoide Method: Summary of Forty Consecutive Cases. R. G. Brown, Brisbane, Australia.—p. 671.

Treatment of Sciatica.—Titus states that in the light of recent studies, sciatica is not a disease in itself but rather a complex symptom due to localized muscular involvement, which produces by virtue of exudates and muscle spasms, pressure, and hence pain, referred to the sciatic nerve. No specific form of therapy has as yet been disovered. Medicaments and local injections have a limited value. Counterirritants in the form of cupping, actual cautery and local ultraviolet irridations offer only temporary relief. Heat in any form is a measure of partial value unless followed by static effluve, wave or spark. The proper modulation of all physical agents, intelligently applied, has been the means of reducing the pain and limited motion in the shortest period of time. The author's report is based on the observation of 600 cases in which the patients were treated chiefly by static electricity.

Arkansas Medical Society Journal, Little Rock

28: 99-120 (Nov.) 1931

Cardiolysis: Case. R. B. Robins and N. S. Word, Camden.—p. 98.
Visceral Syphilis. A. A. Blair, Fort Smith.—p. 100.
Diagnosis of Inflammations of Male Urethra. P. Z. Browne, Hot Springs.—p. 103.

Journal of Immunology, Baltimore

21: 341-415 (Nov.) 1931

*Correlation of Protective Value with Titers of Other Antibodies in Type I Antipneumococcus Serum. L. D. Felton, Boston.—p. 341.
Use of Ethyl Alcohol as Precipitant in Concentration of Antipneumococcus Serum. L. D. Felton, Boston.—p. 357.
Flocculation of Vaccinial Virus-Tissue Suspensions by Specific Antiserums. R. Thompson and L. Buchbinder, New York.—p. 375.
*Anaphylaxis: XIV. Chronaxia of Cardiac Vagus Nerve in Dogs Sensitized to Horse Serum and in Anaphylactic Shock. O. O. Stoland, N. P. Sherwood and R. A. Woodbury, Lawrence, Kan.—p. 393.
Note on Improvement in Method of Vaccine Production with Rickettsia of Mexican Typhus Fever. H. Zinsser and M. R. Castaneda, Boston.—p. 403.
Parenteral Denaturization of Foreign Proteins: VI. Depolymerization, Homologization and Retention. H. C. Sox, J. L. Azevedo and W. H. Manwaring, San Francisco.—p. 409.

Correlation of Protective Value in Antipneumococcus Serum.—Felton studied thirty-nine freshly drawn polyvalent type I and type II antipneumococcus horse serums to find the degree of correlation between the protective titer and various immunologic reactions; namely, specific precipitation, agglutination, neutralization and immune protein precipitable by soluble carbohydrate. He found that for type I the correlation coefficient between protection and precipitin titer is 0.93; between protection and agglutination it is 0.80; between protection and neutralization it is 0.88, and between protection and the amount of protein precipitated with specific carbohydrate it is 0.91. From this degree of correlation it appears evident that, at least for type I freshly drawn serums, immunologic examination other than the expensive mouse protection test can be utilized to estimate the probable therapeutic activity and to standardize antipneumococcus serum.

Anaphylaxis.—Stoland and his associates describe experiments in which they noted that the chronaxia of the vagus nerves in dogs sensitized to horse serum is lower than for normal animals, indicating an increased irritability associated with the development of the hypersensitive state. The decrease in chronaxia may reach such a state that nerve block or apparent decreased irritability occurs. The vagus nerve irritability is not appreciably affected by anaphylactic shock. Anaphylactic shock as shown by fall of blood pressure and prolonged coagulation time does not occur in all dogs supposedly sensitized to horse serum. Stimulation of the vagus nerve before the injection of a shocking dose of antigen may or may not modify the anaphylactic shock. On the basis of their observations the authors conclude that the increased irritability and permeability of tissue in sensitized animals is not the primary factor in anaphylactic shock.

Journal of Pharmacology & Exper. Therap., Baltimore

43: 399-605 (Nov.) 1931

Action of Some Diuretics on Aglomerular Kidney. R. N. Bieter, Baltimore.—p. 399.
Albuminuria in Glomerular and Aglomerular Fish. R. N. Bieter, Baltimore.—p. 407.
Pharmacologic Action of Some Analogues of Physostigmine. J. A. Aeschilimann and M. Reinert, Basle.—p. 413.
*Effect of Carbon Dioxide on Ether, Ethylene and Nitrous Oxide Anesthesia. G. B. Kleindorfer, New Orleans.—p. 445.
Study of Relative Efficiency as "Basal Anesthetics" of "Avertin," Amytal, Chloral, Dial and Isopropylallyl Barbituric Acid. G. B. Kleindorfer and J. T. Halsey, New Orleans.—p. 449.
Caffeine Effect on Crest Uniformity of Muscular Fatigue Curves. R. H. Cheney, Woods Hole, Mass.—p. 457.
*Pharmacologic Properties of Insulin-Free Extract of Pancreas and Circulatory Hormone of Frey. A. H. Elliot and F. R. Nuzum, Santa Barbara, Calif.—p. 463.
Effect of Ephedrine on Contractions of Alimentary Canal in Unanesthetized Dogs. J. H. Kinnaman and O. H. Plant, Iowa City.—p. 477.
Behavior of Papain in Peritoneal Cavity. R. P. Walton, New Orleans.—p. 487.
*Effect of Amytal on Autonomic Nervous System as Indicated by Salivary Glands. G. W. Stavraky, Montreal.—p. 499.
Interaction of Pilocarpine and Histamine on Intestine. F. Bernheim, Durham, N. C.—p. 509.
Note on Tin Compounds in Chemotherapy of Experimental Staphylococcus Infections. J. A. Kolmer, H. Brown and M. J. Harkins, Philadelphia.—p. 515.
Degree of Infection in Relation to Parasiticidal Activity of Chemotherapeutic Compounds. J. A. Kolmer and Anna M. Rule, Philadelphia.—p. 521.
Method of Comparing Absorption of Calcium Preparations. F. Wokes.—p. 531.
Action of Papaverine on Muscular Activity of Alimentary Canal. E. G. Gross and D. H. Slaughter, Iowa City.—p. 551.
Action of Blister Fluid on Isolated Rat's Uterus. G. H. Percival and C. M. Scott, Edinburgh.—p. 563.
Pharmacology and Toxicology of Monohydroxy-Mercuri-Di-Iodo-Resorcin-Sulphonphthalein. D. I. Macht and Helen M. Cook, Baltimore.—p. 571.

Effect of Carbon Dioxide on Ether, Ethylene and Nitrous Oxide Anesthesia.—Kleindorfer reports experiments in which he demonstrated that carbon dioxide in strengths of from 5 to 10 per cent has an additive effect on the anesthesia produced by subanesthetic concentrations of ether or ethylene (white rats and cats) or nitrous oxide (cats).

Insulin-Free Extract of Pancreas.—According to Elliot and Nuzum, insulin-free extract of pancreas causes a transitory fall in blood pressure in the rabbit after intravenous injection. Repeated unit or subunit doses, or continuous intravenous infusion, cause a prolonged hypotension, probably the result of splanchnic vasodilatation. These effects are not attributable to choline or histamine. In persons with hypertension, intravenous injection causes an immediate transitory "nitrite reaction," and a profound fall in systolic pressure, persisting for approximately one hour. These effects are not produced if the extract is given by the subcutaneous or intramuscular route. The coronary arteries of the perfused rabbit's heart are dilated by the extract in dilutions corresponding to a dose in man of from 30 to 60 hypotensive units, twice as much as by theophyllineethylenediamine in dilutions of relative strength. The amplitude of cardiac contraction is decreased, but the rate is little affected. The pressor action of epinephrine may be completely inhibited by intravenous injection of the extract when given with it. If given separately, the extract makes the animal refractory to epinephrine for some minutes following the injection. The pressor response is not inhibited by subcutaneous or intramuscular injection of the extract. The circulatory hormone of Frey, as prepared from the urine, has

identical properties. It may so decrease the amplitude of contraction of the perfused heart as to overshadow the coronary dilatation which becomes apparent after ventricular fibrillation is induced. Neither pancreatic extract nor the Frey hormone, on intravenous injection into the guinea-pig, causes transitory complete heart block, a supposedly specific test for adenylic acid and adenosine, which have similar physiologic properties. It is probable that the active principle of the pancreatic extract and the Frey hormone are identical, and that these preparations do not contain histamine, choline, adenylic acid or adenosine in sufficient quantities to explain their physiologic activity. The increase in the coronary flow and the antagonism to the pressor effect of epinephrine may explain the salutary influence of extract of pancreas as seen in the treatment of angina pectoris and intermittent claudication.

Effect of Amytal on Autonomic Nervous System.—Stavraky describes experiments in which he noted that amytal in amounts sufficient for anesthesia greatly affects the parasympathetic innervation of the submaxillary salivary gland in the dog. The secretory effect from stimulation of the chorda tympani and also the action of choline and acetylcholine are diminished and under large doses are completely abolished. The sympathetic secretory innervation of the submaxillary gland is also disturbed but in a less marked degree than the parasympathetic. After almost complete paralysis of the chorda tympani by amytal, and failure of the usual secretory effect of acetylcholine, the gland responds with a prompt and copious secretion of saliva to average doses of pilocarpine, introduced intravenously. Subminimal doses of physostigmine to a certain extent restore the action of the parasympathetic secretory nerve when paralyzed by amytal; it also temporarily increases the heart rate and raises the blood pressure, improving the condition of the animal though only transiently. The vasodilatation that occurs during stimulation of the chorda tympani is diminished but not completely abolished by amytal, whereas the vasoconstrictor effect of sympathetic stimulation is greatly diminished and sometimes completely absent at the end of the experiment. Under the excessive doses of amytal used throughout the author's investigation, the death of the animal took place after several hours from circulatory shock, with a gradual fall of the blood pressure and diminishing activity of the heart.

Kansas Medical Society Journal, Topeka

32: 361-398 (Nov.) 1931

Skull Fractures and Their Treatment by Country Doctor. B. H. Pope, Kingman.—p. 361.
Science, Art and Bunk in Sacred Calling. R. C. Hutcheson, Elk Falls.—p. 367.
Therapeutic Fever Produced by Diathermy in General Paralysis and Tabes Dorsalis. W. C. Menninger and R. M. Fellows, Topeka.—p. 369.
Reactions of Peritoneum. J. W. Kennedy, Philadelphia.—p. 374.
Acne Vulgaris and Its Treatment. C. O. West, Kansas City.—p. 377.
Exophthalmic Goiter. J. D. Colt, Jr., Manhattan.—p. 380.

Maine Medical Journal, Portland

22: 215-236 (Nov.) 1931

Treatment of Cardiac Arrhythmias. J. O. Piper, Waterville.—p. 216.
Tuberculosis of Skin. F. A. Diasio, New York.—p. 220.
Treatment of Angina Pectoris and Coronary Occlusion. H. B. Sprague, Boston.—p. 224.

Missouri State Medical Assn. Journal, St. Louis

28: 513-570 (Nov.) 1931

Modern Operation for Cancer of Breast. J. N. Jackson, Kansas City.—p. 513.
*Hernia of Urinary Bladder. D. A. Robnett, Columbia.—p. 516.
*Definite Appendical Symptomatology. W. Baumgarten, St. Louis.—p. 519.
Postoperative Complications of Appendicitis. D. S. Conley, Columbia.—p. 521.
*Causes of High Mortality in Appendicitis. H. A. Lowe, Springfield.—p. 525.
When Not to Operate in Case of Acute Appendicitis. A. L. Miller, Kansas City.—p. 528.
Treatment of Acute Appendicitis in Its Two Phases: Before and After Perforation. J. E. Stowers, Kansas City.—p. 531.
*Irritable Colon (Spastic Colon). C. E. Gilliland and E. Sigoloff, St. Louis.—p. 535.
*Improved Method for Roentgen Examination of Colon. P. C. Schnoebelen, St. Louis.—p. 539.
Treatment of Fractures of Upper End of Femur. J. E. Stewart, St. Louis.—p. 540.
Nonvenereal Prostatitis. O. J. Wilhelmi, St. Louis.—p. 543.
Part Time Health Officer and Rural School Sanitation. J. F. Chandler, Oregon.—p. 546.

Hernia of Bladder.—Robnett states that if bladder hernia is suspected before operation, every effort should be made to prove its presence. During all operations for hernia the possibility of bladder hernia should be kept in mind. Any undue thickness of the sac, particularly of the internal and posterior walls, should be carefully examined by palpation, transillumination and other means to exclude bladder attachment. Positive information is often given by passing a catheter or sound with or without distending the bladder, though distention with air or water at times may be helpful. Whenever there is a collection of prehernial fat or fat of the color peculiar to the bladder region, one should look with care for a protrusion of a portion of the bladder or a bladder diverticulum. Bladder pain elicited during operation, or desire to urinate, indicates the nearness of the bladder if not its involvement. If a bladder hernia is found, it should if possible be reduced and retained in place without opening the organ. If the bladder wall is injured either accidentally or on purpose, it should be closed with a double layer of sutures, the second burying the first, and on no account should the sutures pass through the bladder mucosa. A drain should be left to the bladder suture line to take care of any leakage, for one must ever bear in mind that the wounded bladder, even though intentionally wounded, is a potential source of grave danger. When the bladder injury is recognized after operation, immediate reopening of the wound with suture or drainage of the bladder, depending on the individual case, is indicated. If there is extravasation of urine into the peritoneal cavity, the abdomen should be opened, the cavity flushed with physiologic solution of sodium chloride, and liberal drainage installed. Prompt treatment is urgent, for the gravity increases rapidly with each hour's delay.

Appendical Symptomatology.—Baumgarten points out that the significant and most helpful signs of appendicitis are the result of three kinds of irritation which the disease sets up: (1) the referred and reflex results of irritation of the intrinsic nervous mechanism of the appendix, (2) the toxic manifestations and (3) the evidence of secondary inflammatory invasion of contiguous and remote structures. The manifestations that make up the symptoms under these three classes are (1) pain, muscle guard, tenderness and cutaneous hyperalgesia, with a frequently accompanying nausea or vomiting, and constipation, rarely diarrhea; (2) of secondary importance, fever, changes in pulse rate, and leukocytosis, which are to be utilized with care; (3) relatively remote intra-abdominal inflammatory masses which do not play a direct part in the determining symptoms.

Appendicitis.—Lowe calls attention to the fact that the death rate from appendicitis in Missouri has shown a gradual increase since 1924. The mortality rate is from 1.5 to 21 per cent, varying with the type of surgical care and higher in patients from rural communities. Much of the high mortality is found in neglected cases treated by home remedies before a physician is called. The author advocates an educational program for correcting this.

Irritable Colon.—Gilliland and Sigoloff believe that the successful treatment of irritable colon depends chiefly on the full cooperation of the patient. That these patients are difficult to cure is well known because the individual frequently becomes discouraged and returns to his injurious habits, thus aggravating the condition. In the acute attack the differential diagnosis from an organic inflammatory disease offers much difficulty, and operation is at times mistakenly thought necessary. In the chronic cases of spastic colon, diet is an important therapeutic agent. The following bland diet is helpful: meat, chicken, fish, milk, eggs, cream, curds, junket, cottage cheese, butter, well cooked cereals, vegetable purées, stewed fruits and simple desserts. Coffee, tea, condiments, tobacco and alcohol should be restricted or prohibited. If a change in the bacterial flora of the colon is indicated, bacillus acidophilus milk may be prescribed, two glasses two or three times daily. Hydrotherapy is particularly useful in spastic colon. Heat applied to the abdomen in the form of warm moist fomentations, such

as the Priessnitz pack, frequently alleviates the abdominal tenderness and colon spasticity. Massage of the abdomen is contraindicated as it frequently increases the spasticity of the bowel. If drugs are necessary, belladonna and its derivatives are particularly efficacious. Tincture of belladonna, from 8 to 10 minims (0.5 to 0.6 cc.) three times daily, will usually suffice. Because of the insomnia, anxiety and introspection that exist, sedation in the form of the bromides or phenobarbital may prove a valuable adjunct. If there exists a gastric hyperacidity, alkalis are indicated and diluted hydrochloric acid may be used in the cases of anacidity. To allay the intestinal distention from gas, magnesium oxide, 1 Gm. three times a day, or the reduction of carbohydrates in the diet, may be tried. Powdered bismuth or kaolin may be used. Liquid petrolatum and agar should be prescribed in an attempt to reduce the intestinal stasis which is so commonly an aggravating complication. Water should be used freely. The habitual use of cathartics and enemas is objectionable; such abuses aggravate the condition. The use of roughage in the diet likewise defeats the purpose of the treatment and should be forbidden. Operative intervention in cases of uncomplicated spastic colon leaves the patient in worse shape than before. When organic disease exists, the indication for surgery is obvious.

Roentgen Examination of Colon.—Schnoebelen believes that the small enema with several films has a distinct advantage and is an improvement in the study of the colon, since he has observed that it affords (1) a better view of the rectal pouch and sigmoid, (2) a means of studying the function of the rectal pouch, (3) the method of choice in suspected colon obstruction, (4) a supplementary examination for determination of the presence of a small defect in the colon, and (5) a means of investigating the effects of treatment.

New England Journal of Medicine, Boston

205: 1031-1076 (Nov. 26) 1931

Some Interesting Fractures of Spine. G. M. Sabin, Burlington, Vt. —p. 1031.
Bullet Wound of Kidney: Case. R. C. Graves, Boston.—p. 1034.
Remarks on Procedure in Cases of Urinary Obstruction. A. H. Crosbie, Boston.—p. 1035.
Conservative Treatment of Stricture of Urethra. A. Riley, Boston.—p. 1035.
*Intravenous Urography in Infants and Children. T. H. Lanman, Boston. —p. 1036.
Lymphoblastoma as Seen by Urologist. J. D. Barney, Boston.—p. 1038.
Radium in Carcinoma of Prostate. G. G. Smith, Boston.—p. 1040.
Unusual Foreign Body in Bladder: Unusual Type of Obstruction of Upper Ureter. R. F. O'Neil, Boston.—p. 1041.
Hydronephrosis from Aberrant Vessel: Report of End-Result. F. H. Colby, Boston.—p. 1042.
Scrotal Abscess as Complication Following Vasectomy. C. S. Swan, Boston.—p. 1043.
Experimental Transplantation of Ureters into Bowel. J. C. Eckels, Boston.—p. 1045.
Supravital Staining in Neoplasms of Bladder. W. C. Quinby, Boston. —p. 1048.
Changes in Urinary Tract in Women: Result of Normal Pregnancy. E. G. Crabtree, Boston.—p. 1048.
Effect of Changes Due to Pregnancy on Urinary Tract Disease. G. C. Prather, Boston.—p. 1051.
Dr. Martha A. (Hayden) Sawin: First Woman Graduate in Medicine to Practice in Boston. F. C. Waite, Cleveland.—p. 1053.
Late Recognition of Syphilis: Two Cases. W. J. MacDonald, Boston. —p. 1055.

Intravenous Urography.—Lanman believes that the value of intravenous urography in infants and children is limited in cases that have any marked degree of pyuria associated with kidney damage, and this group of cases comprises a large proportion (about 60 per cent) of the disorders of the urinary tract commonly seen in young patients. The evidence obtained in many such cases is inconclusive and unreliable. The dangers of intravenous urography are presumably slight but must be considered. At present one cannot predict from the clinical picture and by various tests of renal function which patients will show a reaction. Cases should be studied carefully and all other simpler means of diagnosis, notably cystography, employed first. Also, complete studies of the renal function should be made. In cases not associated with marked pyuria, intravenous urography may often do away with the need for retrograde pyelography. It may sometimes give information not obtained by retrograde pyelography. Its general use in unselected cases and in cases not carefully studied is to be avoided, both on account of the expense and on account of the uncertainty of the information often obtained. The value of this method of obtaining visualization of the urinary tract is directly proportionate to the user's knowledge of urinary tract disease in this age group and to his experience and skill in the technical procedures necessary for the adequate study and treatment of these conditions.

New York State Journal of Medicine, New York

31: 1373-1434 (Nov. 15) 1931

Study of Cardiovascular Syphilis in Private Practice. L. F. Bishop and L. F. Bishop, Jr., New York.—p. 1373.
Branchiogenic Cyst. L. Schwartz, Jr., New York.—p. 1376.
*Treatment of Infections of Central Nervous System by Forced Spinal Drainage. G. M. Retan, Syracuse.—p. 1378.
Bacteriophages as Help in Treatment of Infections in Children. W. J. MacNeal, New York.—p. 1383.
Place of Otorhinolaryngologist in Treatment of Eye Diseases. E. R. Faulkner, New York.—p. 1386.
Injection Treatment of Varicose Veins. A. M. Dickinson, Albany.—p. 1389.
Psychopathology and Psychotherapy in Neuroses and Psychoses. A. A. Brill, New York.—p. 1392.
Orthopedic Treatment of Anterior Poliomyelitis. A. Whitman, New York. —p. 1397.
Nature and Treatment of Nonspecific Ulcerative Colitis. A. Winkelstein, New York.—p. 1400.
Prevention of Nervous Disorders: Community Program. A. B. Siewers, Syracuse.—p. 1403.

Forced Spinal Drainage.—Retan believes that much more clinical and experimental data will need to accumulate before one can draw any conclusions as to the efficacy of forced spinal drainage in the treatment of infections of the central nervous system. The treatment is theoretically sound. Forced spinal drainage should not be confused with continuous spinal drainage. Continuous spinal drainage is of questionable value in the treatment of preparalytic poliomyelitis although it has been used successfully in certain cases of septic meningitis. The author's work with this method of treatment has convinced him that it is a safe procedure.

Oklahoma State Medical Assn. Journal, Muskogee

24: 345-372 (Nov.) 1931

Psychoses with Other Somatic Diseases. T. M. Boyd, Norman.—p. 345.
Our Responsibility to Nervous Patient. M. S. Gregory, Oklahoma City. —p. 347.
Industrial Aspect of Anterior Poliomyelitis. D. H. O'Donoghue, Oklahoma City.—p. 350.
Case of Mechanical Epilepsy. G. W. Robinson, Jr., Kansas City, Mo. —p. 351.
Diagnosis and Treatment of Pyelonephritis. D. V. Hudson, Tulsa.—p. 353.
Decline and Revival of Movable Kidney Surgery. B. Lewis, G. Carroll and M. Schattyn, St. Louis.—p. 356.
Traumatic Rupture of Kidney. C. K. Smith, Kansas City, Mo.—p. 360.
Solitary Cyst of Kidney with Calcification: Case. J. M. Byrum, Shawnee.—p. 365.

Pennsylvania Medical Journal, Harrisburg

35: 57-154 (Nov.) 1931

Some Aspects of Nasal Accessory Sinusitis. L. M. Hurd, New York. —p. 57.
Rational Therapeutics in Pediatric Practice. J. K. Everhart, Pittsburgh. —p. 62.
Symposium on Circulatory Disorders: Cardiovascular Coefficients. A. P. D'Zmura, Pittsburgh.—p. 66.
Auricular Fibrillation: Analysis of 220 Cases. H. K. Mohler and C. Lintgen, Philadelphia.—p. 68.
*Malignant Hypertension Simulating Brain Tumor. O. H. P. Pepper, Philadelphia.—p. 75.
Allergic Factor in Dermatology. L. H. Criep, Pittsburgh.—p. 78.
*Criteria for Estimating Value of Compounds Employed in Treatment of Syphilis and Amount of Treatment to Administer. J. A. Kolmer, Philadelphia.—p. 81.
Indications for Surgical Treatment of Primary Pituitary Lesions, with Description of Approved Methods of Approach. C. H. Frazier, Philadelphia.—p. 88.

Malignant Hypertension Simulating Brain Tumor.—Pepper believes that the correct differential diagnosis between malignant hypertension and various cerebral lesions can and should be made. One should remember that malignant hypertension in children is not so very uncommon. Malignant hypertension may be accompanied by great increase of intracranial pressure in the absence of gross hemorrhage and without obvious renal failure. It may be accompanied by a papilledema

of at least 6 diopters of swelling, but the retinal picture can often be recognized by an expert ophthalmologist. The spinal fluid pressure may reach 500 mm. of water in malignant hypertension. High blood pressure is rarely if ever caused by a slowly developing mass lesion of the brain. The differential diagnosis between malignant hypertension and such lesions of the brain as tumor and abscess can usually be made. While temporary relief may sometimes be given to patients with malignant hypertension by decompression, the latter is probably never justified. Repeated spinal fluid removals and other measures to reduce intracranial pressure will give better results.

Value of Compounds Employed in Treatment of Syphilis.—Kolmer states that during the past ten to fifteen years so many new compounds of arsenic, bismuth, mercury and other substances have been produced and advocated for the treatment of syphilis that the physician may easily become bewildered and doubtful in making a selection; particularly since all, or at least the majority, have been backed by various claims of superiority and the inevitable testimonials of more or less authenticity and value. For example, on the market there are dozens of different compounds of bismuth of domestic and foreign manufacture, not to mention a large number of trivalent and pentavalent arsenicals and various compounds of mercury. Much of this is due to commercial competition, but the situation urgently demands as clearly defined criteria as possible in the light of present knowledge for passing judgment on present and future compounds and making selections for one's therapeutic armamentarium. Furthermore, a great deal of confusion and doubt exists, even among expert syphilologists, as to the relative values of different compounds, and it would therefore seem futile to attempt any plan of standardization of treatment until this matter is placed on a sound scientific basis. Furthermore, it is common knowledge that a great deal of inadequate treatment is even now being administered in all good faith. This is not a matter of surprise when one remembers the number of different plans that exist, even for the treatment of acute early syphilis, while in the treatment of chronic syphilis the situation is one of almost complete chaos. The author discusses in detail the animal toxicity tests, the spirocheticidal tests, and the trypanocidal tests that are used to estimate the value of compounds employed in the treatment of syphilis. Under criteria for estimating the amount of treatment to administer, he discusses microscopic studies, clinical relapse and the Wassermann reaction.

Philippine Islands Med. Association Journal, Manila

11: 385-424 (Oct.) 1931

Ear and General Practitioner. A. S. Fernando.—p. 385.
Sedimentation Reaction of Erythrocytes Among Normal and Puerperal Filipino Women: Preliminary Report. B. Roxas and A. Baens.—p. 393.
Report on Cases of Carbuncle. J. R. Roxas.—p. 396.
Refraction. C. D. Ayuyao.—p. 403.
Typhoid-Paratyphoid Vaccine Treatment of Dementia Praecox (Schizophrenia): Preliminary Report. T. Joson.—p. 405.

Public Health Reports, Washington, D. C.

46: 2775-2836 (Nov. 20) 1931

Mosquitoes Transported by Airplanes: Staining Method Used in Determining Their Importation. T. H. D. Griffitts and J. J. Griffitts.—p. 2775.
*Leprosy: Study of White Blood Cells and Their Relation to Clinical Progress. L. F. Badger.—p. 2782.

Leprosy.—Badger studied the white blood cell pictures in seventy-five uncomplicated cases of leprosy, in which the patients were not suffering with acute or subacute leprous reactions. The total leukocyte counts and the numbers of the different types of white cells were found to be within normal limits. These cases were studied from the aspects of bacteriology, type of leprosy, degree of skin involvements, stage of activity, and chaulmoogra oil therapy. No apparent relation between these factors and the white blood cell picture was noted. The blood pictures of 126 patients were studied in relation to the clinical progress of the disease. There were noted definite changes in the white blood cell picture correlating clinical changes. This study suggests that frequent examinations of the blood are of practical value in the treatment of leprosy, in determining the value of a therapeutic agent, in predicating leprous reactions and reactivation, and in determining the fitness of a patient for parole. The blood examinations, in addition to the bacteriologic and clinical examinations, aid in the determination of the true progress of a patient.

Virginia Medical Monthly, Richmond

58: 495-566 (Nov.) 1931

Some Medical Topics of Special Current Interest. J. A. Hodges, Richmond.—p. 495.
Observations on Nature and Pathologic Physiology of Clinical Allergy. O. Swineford, University.—p. 498.
Selecting Treatment for Hemorrhoids. E. H. Terrell, Richmond.—p. 504.
Dangerous Preschool Age and Our Obligations. L. M. Hines, Drill.—p. 507.
Present Concepts of Female Sex Hormones and Their Clinical Application. E. C. Hamblen, University.—p. 509.
Irradiation in Treatment of Malignant Tumors of Urinary Tract. C. W. Eley, Norfolk.—p. 512.
Contraindications for Laparotomy. W. J. Mallory, Washington, D. C.—p. 515.
Practical Points in Roentgenologic Diagnosis of Peptic Ulcer. B. R. Kirklin, Rochester, Minn.—p. 517.
Ureteral Stones—Review of Three Hundred Cases. W. M. Coppridge, Durham, N. C.—p. 520.
Emotions and Character as Related to Art in Medicine. F. M. Horsley, Arrington.—p. 525.
U. S. P. and N. F. Preparations Versus Proprietary Remedies. W. G. Crockett, Richmond.—p. 527.
Aschheim-Zondek Test for Pregnancy. J. J. Mundell, Washington, D. C.—p. 528.
Early Diagnosis of Carcinoma of Breast. I. A. Bigger, Richmond.—p. 529.
Deformities of Colon: Low Cecum with Absence of Ascending Colon and Hepatic Flexure: Case Report. J. A. Reed, Washington, D. C.—p. 532.
Observations in 500 Cases of Acne, Treated with 2,432 Exposures of Roentgen Ray. C. A. Simpson, Washington, D. C.—p. 535.
Infections of Upper Respiratory Tract in Children. T. D. Jones, Richmond.—p. 537.
Study of Congenital Syphilis. J. M. Bishop, Roanoke.—p. 541.
Agranulocytic Angina—Case Report with Autopsy Findings. J. K. Richardson, Richmond.—p. 545.

Western J. Surg., Obst. & Gynecology, Portland, Ore.

39: 809-888 (Nov.) 1931

*Carcinoma of Breast Removed by Actual Cautery. J. T. Mason and H. W. Rose, Seattle.—p. 821.
*Prognosis and Treatment of Malignant Goiter. R. S. Dinsmore, Cleveland.—p. 828.
Sarcoma of Stomach. E. V. Askey, E. M. Hall and K. S. Davis, Los Angeles.—p. 839.
Report of Case of Sarcoma of Stomach. C. L. Gilstrap, La Grande, Ore.—p. 848.
Spinal Anesthesia in General Surgical Practice. A. W. Hoaglund, Minneapolis.—p. 852.
Clinical and Pathologic Study of Carcinomatous Gastric Ulcer; with Particular Reference to Grading of Malignancy. W. H. Bueermann, Portland, Ore.—p. 855.

Cautery in Breast Carcinoma.—Mason and Rose believe that the theory of cauterization in carcinoma of the breast is sound. It is based on research work done in the past, when it was proved that carcinoma cells were killed at a lower temperature than is necessary to kill normal tissue. The cautery method is superior to the knife operation. The percentage of local recurrence is less, death from metastasis is less, and the percentage of living and well is more than twice that following the knife operation. From the operative standpoint the cautery is more beneficial to the patient, as it lessens the time of operation and causes almost no bleeding and practically no pain after the operation.

Malignant Goiter.—From a series of thirteen cases which he presents, Dinsmore draws the following conclusions: 1. The prognosis in cases of malignant goiter depends first on the type of tumor and secondly on its extent. 2. In cases of sarcoma the results have indicated the duration of life is short, as every patient, with two exceptions, has died within a short time. 3. A like prognosis must be made in cases of sarcoma-carcinoma and of scirrhous carcinoma, which are always fatal. 4. In cases of adenocarcinoma that do not arise from tumor tissue, the prognosis is favorable. The author knows of no patient who has died from this cause. 5. The foregoing four groups fortunately represent only 12 per cent of the malignant tumors of the thyroid. The remaining 88 per cent offer a prognosis which is much more encouraging than is generally supposed. 6. Papillary carcinomas treated by combined surgery and roentgen rays give a 50 per cent three-year cure, and malignant adenomas a 25.8 per cent three-year cure.

FOREIGN

An asterisk (*) before a title indicates that the article is abstracted below. Single case reports and trials of new drugs are usually omitted.

Indian Journal of Medical Research, Calcutta

19: 353-704 (Oct.) 1931. Partial Index

Note on Expectation of Relative Prevalence of Plasmodial Species When Based Solely on Relative Output of Gametocytes. H. H. King.—p. 353.
Some Sources of Vitamin C in India: Antiscorbutic Values of Fruits: Part II. Cont'd. R. C. Wats and W. I. White.—p. 393.
Addiction to "Post"—Unlanced Capsules of Papaver Somniferum: Part II. Composition of Lanced and Unlanced Capsules. R. N. Chopra and N. N. Ghose.—p. 415.
Changes in Physical Properties of Kala-Azar Serum with Treatment and Its Relation to Formolgel Reaction. R. N. Chopra, S. G. Choudhury and N. N. De.—p. 423.
Blood Findings in Normal Monkeys. H. S. Bilimoria.—p. 431.
Studies in Histology of Spleen, Bone, Marrow and Liver in Cases with Splenomegaly, with Especial Reference to Those Due to Kala-Azar: (1) Connective Tissue and Reticulum. G. Shanks and M. N. De.—p. 457.
*Pathology of Epidemic Dropsy. G. Shanks and M. N. De.—p. 469.
Stillbirth and Neonatal Death in India: Preliminary Inquiry. Christine J. Thomson.—p. 491.
Relative Value of Oocyst Rate and Sporozoite Rate in Anopheles. M. O. T. Iyengar.—p. 525.
*Observations on Anemia in Patients with Enlarged Malarial Spleens. T. A. Hughes and D. L. Shrivastava.—p. 565.
*Changes in Blood Chemistry in Osteomalacia During Treatment. T. A. Hughes, D. L. Shrivastava and K. S. Malik.—p. 593.
Fractionation of Typhoid Immune Rabbit Serums and Effect of Heat and Age on H and O Titer of Typhoid Convalescent Human Serums. M. L. Ahuja.—p. 601.
Agglutination in Leishmaniasis. R. Row.—p. 641.
*Erythrocyte Sedimentation Rate in Kala-Azar. L. E. Napier and J. M. Henderson.—p. 691.
*Experimental Observations on Cholera 'Phage Lysate as Component of Prophylactic Cholera Vaccine. G. C. Maitra and S. M. K. Mallick.—p. 701.

Pathology of Epidemic Dropsy.—The pathologic changes in four cases of fatal epidemic dropsy are described by Shanks and De. In all four the chief features were similar and consisted of extreme and widespread dilatation of the capillaries. These dilated vessels are seen most abundantly in fatty tissue in such situations as in the stratum subcutaneum and under the pericardium and peritoneum. In certain cases, in the skin, the dilated vessels may push the epidermis outward, producing "angiomatous" nodules, which may rupture and result in hemorrhage. The intoxication in epidemic dropsy seems to give rise to dilatation of the capillaries, and this feature is most marked, apparently, in situations where the vessels have the weakest tissue support.

Anemia in Patients with Enlarged Malarial Spleens.—Hughes and Shrivastava made a study of the types of anemia seen in chronic malarial patients with splenomegaly who showed few or no signs of active malarial infection. Thirty-one cases were examined. The factors concerned in the production of anemia in these patients are discussed and it is suggested that in the milder cases the blood condition is due, to a greater or less extent, to destruction of the erythrocytes by the reticuloendothelial cells of the enlarged spleen (and possibly of other organs), facilitated in some instances by abnormal fragility of the corpuscles. In the severe cases there were, in addition to evidences of blood destruction, signs of derangement of the function of the bone marrow. This may have been the result of malaria, dietetic deficiencies or other causes. In four such cases the patients were treated with liver and iron, and improvement took place in three. In the fourth there was no rise in the red cells and little increase in the hemoglobin, although there were indications of increased marrow activity. In this patient the behavior of the plasma bilirubin led to the conclusion that destruction of the corpuscles was keeping pace with their production. A description is given of three cases of severe anemia associated with pregnancy. The patients had enlarged spleens, and one patient had active benign tertian malaria at the time of observation. The resemblance of these cases to the others is pointed out. Two patients, who were treated with quinine, plasmochin, liver and iron, responded well.

Changes in Blood Chemistry in Osteomalacia.—In the treatment of osteomalacia, Hughes and his associates have found that, whatever the initial values of the serum calcium and inorganic phosphorus, the most marked improvement, both symptomatically and roentgenologically, occurs when the former is maintained at the normal level and the latter at a height as great as, or greater than, that at which it exists in the blood of infants and young children. This is commonly stated to be from 4 to 6 mg. per hundred cubic centimeters. In patients who start with a normal or slightly reduced calcium and an inorganic phosphorus at a normal adult figure there is generally a steady rise in the latter when treatment is beneficial. A secondary fall is seen in the presence of intercurrent disease and is associated with a return of symptoms. In high phosphorus, low calcium cases the phosphorus sometimes drops a little at first as the calcium rises. It is interesting to note that the inorganic phosphorus of the blood attains the "infantile" level during the healing of large fractures.

Erythrocyte Sedimentation Rate in Kala-Azar.—Napier and Henderson believe that although the sedimentation rate is probably greater in kala-azar than in any other disease the estimation of this rate is unlikely to prove a measure of any practical diagnostic value. They conclude that no information of any prognostic significance will be obtained by carrying out either a single estimation or a series of estimations in a kala-azar patient under treatment.

Experimental Observations on Cholera Bacteriophage Lysate.—According to Maitra and Mallick, the bacteriophage lysate of cholera vibrio in 1 to 3 cc. doses given subcutaneously is innocuous to rabbits. Used subcutaneously as an antigen, the bacteriophage lysate of cholera vibrio after a fortnight does not afford any protection to rabbits against 1.5 times minimal lethal doses of cholera vaccine given by the intravenous route. The addition of corresponding bacteriophage lysate to the standard cholera vaccine does not seem to enhance the bactericidal power of immune serums of experimental rabbits. Agglutination titers of immune cholera serums raised experimentally are not always proportional to the bactericidal efficiency of those serums in vitro.

Journal of Pathology and Bacteriology, Edinburgh

34: 701-812 (Nov.) 1931

*Pathologic Occurrences in Liver in Experimental Venous Stagnation. C. Bolton and W. G. Barnard.—p. 701.
Embryonic Tumor of Kidney in Fetus. G. W. Nicholson.—p. 711.
*Anticarcinogenic Action of Dichlorethyl Sulphide (Mustard Gas). I. Berenblum.—p. 731.
Effect of Testicular Passage on Virus of Herpes. W. Smith.—p. 747.
Pulmonary Asbestosis in Dog. Norah H. Schuster.—p. 751.
Flocculation Reaction with Staphylococcal Toxin. F. M. Burnet.—p. 759.
Red Cell Measurements: Comparison of Diffraction Method and Microscopic Method. A. Pijper.—p. 771.
*Concentration of Hemoglobin in Normal Human Blood. C. Price-Jones.—p. 779.
Vital Staining of Malignant Cells in Peritoneal Effusion. R. A. Hickling.—p. 789.
Hemochromatosis in Depancreatized Cat. J. Taylor, D. Stiven and E. W. Reid.—p. 793.
Patent Ductus Arteriosus with Patent Interventricular Foramen of Dog's Heart. T. Hare and A. B. Orr.—p. 799.
Disappearance of Lymphocytes from Blood Following Exposures to Roentgen Rays and Radium. J. C. Mottram.—p. 800.
Tumor Resistance. H. Burrows.—p. 802.

Portal Stagnation.—Bolton and Barnard state that when any obstacle is interposed to the return of blood through the inferior vena cava to the heart, whether it is due to right-sided heart failure from one of its numerous causes or to increased pressure in the chest in any of its forms, the resulting increase of venous pressure passes back through the liver to the portal vein, but, owing to distention of the capacious splanchnic area, a high portal pressure sufficient to maintain compensation is impossible and the arterial pressure falls. Arterial constriction does not relieve the condition. At this stage there is marked venous stagnation in the liver with resulting necrosis and cellular degeneration; there is an increase of lymph production and the lymph stagnates in the liver and leaks out of the capsule as ascites. The other organs, to which the liver acts as a buffer, do not show such extensive changes, their capillaries are congested, and excessive lymph production leads to dropsical effusion. At a later stage the blood increases in volume and the pressures go up in all parts; the flow of blood through the liver and the lymph flow from its lymphatics are increased. In this way compensation is partially effected, and in local obstruction of the inferior vena cava anastomoses, more readily established in the systemic than in the portal area, complete the process of compensation,

although the liver contains permanently dilated channels round the hepatic venules. In the condition of congestive heart failure, recovery of the heart entirely removes the obstruction, and compensation is completely restored; after repeated attacks the liver and great veins remain permanently dilated. Any subsequent necrosis of the cells must be looked on as the result of an acute exacerbation of the congestion.

Tar and Mustard Gas. — According to Berenblum, the inhibition of the induction of warts, which results when dichlorethylsulphide is added to a carcinogenic tar, is due to some local action of the mustard gas on the tissues, causing the latter to become refractory to the carcinogenic action of the tar. This refractory state develops almost as soon as the mustard gas treatment is begun, and subsides very soon after this treatment is discontinued. While the induction of a wart is inhibited, neither the preliminary hyperplasia of the epithelium nor the subsequent growth of the warts is in any way interfered with, when mustard gas is allowed to act on the skin. In brief, therefore, the inhibitory effect is a process, strictly limited in extent and time of action, which interferes with the induction of a wart without influencing the epithelial changes which either precede or follow the actual induction of the wart. Though it has been possible to produce a simple wart in one mouse as a result of repeated application of a 0.05 per cent solution of mustard gas in liquid petrolatum, it is doubtful whether mustard gas can be safely considered as a carcinogenic agent. While the author's earlier experiments were in keeping with the view that the inhibition was due merely to the production of a superoptimal degree of irritation, subsequent experiments have failed to support this hypothesis. It becomes necessary, therefore, to consider whether the inhibition is after all due to some specific chemical action of mustard gas on the tissues. The fact that mustard gas can inhibit the induction of tar warts without interfering with the early epithelial hyperplasia suggests that no parallel can be drawn between the amount of hyperplasia produced by an irritant and the carcinogenicity of that irritant.

Normal Concentration of Hemoglobin. — Price-Jones reports that the mean concentration of hemoglobin in the blood of healthy men in London is represented by 105 per cent on the scale of the Haldane hemoglobinometer, and in women by 98 per cent. Similar men in Boston average 112 per cent, and figures of this order have been found by a number of recent observers. The van Slyke method of determining the oxygen capacity of the blood gives results slightly higher but not certainly different from those given by Haldane's ferricyanide method. The author suggests that chronic carbon monoxide poisoning from petrol engines is partly responsible for the high levels of hemoglobin now found.

Lancet, London

2: 1057-1112 (Nov. 14) 1931

*Radiotherapy in Cancer of Upper Air Passages. W. D. Harmer.—p. 1057.
*An Analogy Between Eyestrain and Cardiac Pain. A. M. Ramsay.—p. 1063.
*Rupture of Ovarian Blood Cysts Simulating Acute Appendicitis. R. H. Boggon and A. J. Wrigley.—p. 1068.
Bronchial Asthma: Two Cases. P. J. Cammidge.—p. 1070.
On Bier's (Arterial) Hyperemic Method. A. Heys.—p. 1073.

Radiotherapy in Cancer of Upper Air Passages.—Harmer believes that with careful treatment palliative relief can be afforded by ray treatments in a large percentage of the advanced cases of cancer of the upper air passages, with very little danger. It is safer to treat the virulent types of cancer with rays than with surgery alone. Even early cancers may confidently be treated by irradiation by experts. There is reason to believe that external irradiation will be found to be necessary in nearly all cases before local treatment with radium, but it is not clear at present whether roentgen rays or large quantities of radium will produce the best effects.

Eyestrain and Cardiac Pain.—Ramsay emphasizes the fact that pain is the predominating symptom both in eyestrain and in angina pectoris. Fortunately, however, not every pain in the region of the heart is pathognomonic of true angina pectoris. In certain circumstances, pain, typical both in character and in area of distribution, may be complained of by patients in whom no evidence of cardiac disease can be detected. In the heart as in the eye, therefore, pain is symptomatic of several different conditions, each of which must be discovered and removed before relief is possible. Sometimes disordered innervation persists until the pain becomes a habit and the patient a confirmed neurasthenic. In many of these cases no structural disease can be discovered; consequently the invalidism is due entirely to the symptoms. It is well known that a tendency to certain ailments "goes in families," and as vulnerability may be local rather than general, hereditary predisposition plays an important part in determining whether, in the case under consideration, it will be the eye or the heart that is affected. In all likelihood, headache will occur in the one case, and cardiac pain in the other, and in both instances the symptom will be either persistent or recurrent.

Rupture of Ovarian Blood Cysts.—Boggon and Wrigley report thirteen cases of rupture of ovarian blood cysts simulating acute appendicitis. In no case was the preoperative diagnosis of acute appendicitis really in doubt, and in no case was the operation in the nature of an exploratory laparotomy for a condition possessing the somewhat ambiguous diagnosis of, for example, an acute condition of the abdomen. In all the patients there was no obvious disease of the appendix present, and in all thirteen instances the symptoms had been produced by a rupture of a hemorrhagic cyst of the ovary. The appendix was removed *en passant*, however, in all but one patient. The result in all cases was good, an uninterrupted recovery following this line of treatment. The average duration of symptoms prior to operation was just under two days, the mean being thirty-four and one-half hours. The shortest time was twelve hours, and three days was the longest. With regard to the age of the patients, the youngest was 18 years and the eldest 46 years. The average age was 27.7 years, and thus it is seen that it is commonly a disease of young women. There appeared to be no definite relation to marriage, for eight patients were single and five were married. On examination of these cases the most striking point is the excellent general condition of the patients, as compared with their abdominal signs and symptoms. The patient may have severe abdominal pain, much vomiting and a tender and rigid abdomen but yet look remarkably fit and well. The temperature is usually in the region of 99 F. but in one patient it reached 101 F. The pulse rate is proportionately raised and therefore is not very fast. The variation in the authors' cases was between 64 and 130 beats a minute. The tongue was slightly furred in the majority of cases but was clean in a few, in contradistinction to acute appendicitis, when a dirty tongue is to be expected. On abdominal examination, the noticeable points were the marked tenderness and hyperesthesia, and in many cases this was associated with muscular rigidity. In five cases this tenderness and rigidity were definitely localized in the right iliac fossa, and in the remaining eight the whole of the lower abdomen was affected; but in six of these it was more marked on the right side. Rectal and vaginal examinations were found to be of little or no value in the patients on whom they were carried out.

Medical Journal of Australia, Sydney

2: 469-498 (Oct. 17) 1931

Some Aspects of Public Hygiene and Health Administration in South Australia. C. E. C. Wilson.—p. 469.
Influence of Insulin and Adrenalin on Carbohydrate Metabolism. A. B. Corkill.—p. 477.
Treatment of Snake Bite in Australia. C. H. Kellaway and F. G. Morgan.—p. 482.

2: 499-532 (Oct. 24) 1931

Cesarean Section: Series of Thirteen Cases. B. Dawson.—p. 499.
Treatment of Epitheliomatous Glands of Neck. R. K. Scott.—p. 505.
*Modern Treatment of Mammary Cancer. H. M. Moran.—p. 512.
Carcinoma of Breast Treated by Radium: Short Clinical Experience. H. A. McCoy.—p. 515.

Modern Treatment of Mammary Cancer.—According to Moran, there is so wide a variation within the limits of each type of mammary cancer that any general statement can be considered as only approximately true. The adenocarcinoma is not as a rule suitable for irradiation. The more cystic it is, the less sensitive. A high proportion of the successful surgical results are obtained from this cancer. The medullary or

encephaloid carcinoma is sensitive to irradiation. This growth and the true sarcomas of the breast may be the first types of malignant mammary disease in which operation will be contraindicated. In regard to acute carcinosis, the tumor cells are highly sensitive, but the effect of irradiation is at best temporary and may hasten the inevitable end because of the toxic effect of the large number of cancer cells destroyed. Neither surgery nor irradiation is indicated. Irradiation finds scirrhous carcinoma a somewhat refractory cancer, and since surgical operation has also many failures in these cases, the association of the two methods is advisable. The conception of setting up a "barrage" by irradiation is an entirely wrong one. Cancer cells must always be directly destroyed. The local and distant recurrences of scirrhous carcinoma are more sensitive than the primary lesion. Cancer en cuirasse and the peau d'orange condition do not react well to irradiation. Fibrocarcinoma following chronic mastitis is, like the scirrhus, a difficult proposition for radiotherapy. The combined method of interstitially applied radium and high voltage roentgen irradiation or radium on surface molds is alone capable of delivering the necessary dose. The mucoid carcinoma is relatively benign and radioresistant, so that surgical operation is indicated. It is an axiom that secreting cells are radioresistant. There are other purely clinical factors to be considered. The thin woman with a small breast is more suitable for irradiation than the fat patient with voluminous mamma. The very young patients who suffer from cancer of the breast do badly, no matter how they are treated.

Annales de l'Institut Pasteur, Paris

47: 339-457 (Oct.) 1931

*Antitoxin Production: Mixture of Specific Antigen and Nonspecific Substances. G. Ramon.—p. 339.
Development of Antibodies in Horses Injected by Various Routes with Diphtheritic Antigen. A. Bessemans, G. Ramon and F. de Potter.—p. 358.
New Contribution to Study of B C G Vaccine. H. Buschmann.—p. 374.
Vaccination of Cattle Against Tuberculosis According to Calmette and Guérin. O. Bang, I. Jundell and H. Magnusson.—p. 386.
Action of B C G in Hogs. I. Jundell and H. Magnusson.—p. 408.
Discussion of Researches on Strains of Leptospira. A. Bessemans and U. Thiry.—p. 429.
Cutaneous Antidiphtheritic Vaccination of Guinea-Pigs. F. Lanfranchi.—p. 445.
*Toxicity of Aluminum Compared with Iron, Nickel and Other Metals. G. Bertrand and P. Serbescu.—p. 451.

Antitoxin Production: Mixture of Specific Antigen and Nonspecific Substances.—Ramon asserts that the power of antitoxin production in the horse does not disappear. A level may be reached considerably above the titer at the end of the period of hyperimmunization. Moreover, an animal that does not seem capable of antitoxin production may furnish an abundant quantity. His experiments prove that active antitetanus immunization may be improved if in the vaccination of domestic animals substances such as tapioca or calcium chloride are added to the toxoid and if in the vaccination in man the combination of antityphoid vaccine and toxoid is used. This modification resulted in an intensive production of diphtheria and tetanus antitoxins when there was a reduction through incapacity or exhaustion of that production; there was a prolongation of the period of production of the same antitoxins in the animals that remained in a good general condition.

Toxicity of Aluminum Compared with Iron, Nickel and Other Metals.—Bertrand and Serbescu used the sulphates of copper, nickel, cadmium, cobalt, zinc, manganese, aluminum and bivalent iron and the chloride of trivalent iron in concentrations of 1 Gm. dissolved in one liter of double-distilled water, and injected subcutaneously into the abdomen of guinea-pigs with constant doses of 100 mg. per kilogram of body weight. They observed that stronger doses were lethal before complete absorption took place. When smaller doses were utilized, the individual differences were increased and prediction of the period of survival after injection became more difficult. The order of toxicity from the more toxic to the least toxic is as follows: copper, nickel, cadmium, cobalt, zinc, manganese, trivalent iron, aluminum and bivalent iron. The same differences in toxicity between copper, nickel and aluminum were noted when rabbits were injected with doses of 100 mg. per kilogram of body weight, and the same animal individual differences were accentuated and longer periods of survival were noted when smaller doses were used. All the results show that aluminum is similar to iron and less toxic than nickel and copper when used in the manufacture of cooking utensils. The authors believe that minimal quantities of aluminum introduced artificially in food are innocuous; these quantities are no larger than those found in a normal state in the tissues of plants and animals.

Clinica Chirurgica, Milan

34: 953-1056 (Sept.) 1931

*Pulse and Blood Pressure in Certain Cases of Cranial Fracture. A. Pezcoller.—p. 953.
*Ureal Nitrogen in the Blood and Spinal Fluid in Craniocerebral Traumas. G. Rotolo.—p. 967.
Strangulated Internal Hernia of Inferior Ileocecal Fossa. F. Rossi.—p. 984.
Double Gastric Ulcer with Double Chronic Perforation into Pancreas and into Anterior Abdominal Wall. O. Amorosi.—p. 997.
Tuberculosis and Cancer in Same Organ. C. Virnicchi.—p. 1010.

Pulse and Blood Pressure in Certain Cases of Cranial Fracture.—From observations in twenty cases of cranial fracture, Pezcoller concludes that the changes in the frequency of the pulse and of the highest arterial pressure may constitute in craniocerebral traumas the only symptoms of an incipient increase of endocranial pressure, an increase that is revealed solely by the outcome of lumbar puncture.

Ureal Nitrogen in the Blood and Spinal Fluid in Craniocerebral Traumas.—Rotolo studied the changes in the nitrogen (ureal nitrogen) content of the blood and of the spinal fluid in twenty patients who had suffered a craniocerebral trauma (fracture of the face or of the base of the cranium). He found always a sensible increase of the urea content in both the blood and the spinal fluid. This hyperazotemia, a transitory manifestation, is not confined to craniocerebral traumas but is common to every type of fracture and appears more marked when the lesions of the soft parts are more severe, as the author observed in a group of fractures of the limbs. Nevertheless, the author is inclined to think that in the two cases studied the temporary increase of nitrogen was due to the same mechanism and does not imply any special gravity of the prognosis.

Pediatria, Naples

39: 1209-1264 (Nov. 15) 1931

Pneumococcus Meningitis: Four Cases. L. Cerza.—p. 1209.
Corpuscular Resistance and Bilirubinemia in Tuberculous Children During Tuberculin Shock. I. Gatto and I. Traina.—p. 1224.
*Nile Blue Test for Diagnosis of State of Lactation in Women. V. Borra and Margrit Goldschmidt.—p. 1234.
Unexpected Necropsy Observation in Case of Spastic Tetraplegia. F. Rolando.—p. 1246.

Nile Blue Test for Diagnosis of State of Lactation in Women.—Borra and Goldschmidt studied the action of the nile blue test proposed by Bunn Ici Kurriva and Masataka Konischi for the differentiation of various kinds of human milk. They found that there were rather marked differences between the colostrum and the milk, and between the milk of the first months after birth and that of successive periods; but the values obtained were not significant enough to permit positive diagnosis of the state of lactation. As regards the mechanism of the reaction, the authors conclude that it is due to the variations in the content of volatile fatty acids, which differs with the animal species and, within minimal limits, also with the condition of the milk.

Riforma Medica, Naples

47: 1619-1656 (Oct. 26) 1931

Useful Symptom for Diagnosis of "Accretio Cordis." M. Ascoli.—p. 1619.
Is Paradentosis a General Disease or Only a Local Condition? F. Boenheim.—p. 1621.
*Significance of a Peculiar Alopecia of Legs in Persons Presenting Hyperuricemia. A. Paglia.—p. 1623.

Significance of a Peculiar Alopecia of Legs.—Paglia concludes that there is in reality a distinct type of alopecia, as described by Tommasi, which may be differentiated from every other type. Its incidence rises to 12.5 per cent in persons with skin diseases and drops to 3.5 per cent in persons with syphilis and other venereal diseases and to 3 per cent in patients in the departments of internal medicine, surgery and neuropathology. As a rule, it is associated with other constitutional and somatic factors or with clinical semeiologic or laboratory

signs that depend frankly on a uricemic and gouty state. His statistical and experimental researches confirm the significance of the symptom of hyperuricemia or, better, of neuro-arthritism and retarded uric acid exchange, which his teacher was the first to recognize. This sign, in view of its easy recognition, its frankness and the great frequency with which it is encountered in gouty constitutions, deserves possibly the dignity of a symptom. The symptom consists of a symmetrical alopecia on the outer posterior and the outer lateral surfaces of the legs, and especially of the distal two thirds.

Rivista di Patologia e Clin. della Tuberculosi, Bologna

5: 817-906 (Oct. 31) 1931

Cervico-Apical Tuberculosis as Compared with Hilocentral Tuberculosis. A. Campani and R. Balli.—p. 817.
Structure of Tuberculous Nodule. G. Portoghese.—p. 834.
*Pulmonary Tuberculosis: Treatment with Simultaneous Bilateral Pneumothorax. P. Spitzer Spizzi.—p. 840.
Diagnostic, Clinical and Prognostic Considerations in a Case of Cavitary Pulmonary Tuberculosis. G. Simonetti.—p. 850.
Infantile Paralysis and Pulmonary Tuberculosis. D. Bettini.—p. 859.
External Immobilization of Thorax in Treatment of Pulmonary Tuberculosis. E. Riccioli.—p. 862.

Pulmonary Tuberculosis: Treatment with Simultaneous Bilateral Pneumothorax.—Spizzi reports that, of his five cases, in two he employed bilateral pneumothorax according to the classic indications; namely, the manifestation of contralateral pulmonary symptoms during monolateral pneumothorax treatment. In these two cases he did not achieve any success. One patient died from a spontaneous pneumothorax that developed after the first insufflation of gas into the side treated in the second stage. The fatal outcome in this case was unquestionably due to the attempt to apply bilateral pneumothorax. The other case, in which bilateral pneumothorax was tried as a last resort, had also a negative result, because the condition of the patient was too grave and the form too destructive and too progressive. Later the author employed bilateral pneumothorax in patients that were in better general condition. In the cases in which he applied pneumothorax to both sides with an interval of only a few days between the two interventions, in patients with evolutive bilateral pulmonary tuberculosis, the success of the treatment was very good. One of these three patients, in spite of the complication empyema, for which oleothorax was applied, was in excellent condition at the time of Spizzi's report. A second patient also was much improved. The third patient, notwithstanding the short duration of the treatment on one side, is today in good health. These three patients were in good general condition at the beginning of treatment and hence more qualified for this intervention.

Semana Médica, Buenos Aires

38: 1309-1376 (Oct. 29) 1931. Partial Index

Synchronic Operative Standard Team Work in Typical Surgical Interventions; Direct Appendectomy. G. Bosch Arana.—p. 1309.
Insulin in Treatment of Gastric and Duodenal Ulcers. J. R. Goyena.—p. 1338.
Problems on Daltonism. R. Arganaraz and E. Adrogué.—p. 1341.
*Oscillometric and Oscillographic Determinations of Mean Blood Pressure. T. Martini and A. Dóssola.—p. 1343.
Bismuth in Treatment of Syphilis. E. R. Gaviña Alvarado.—p. 1347.
*Postdiphtheritic Polyneuritis with Predominant Cephaloplegic Symptoms. J. M. Macera and A. L. Domenech.—p. 1359.

Oscillographic Determinations of Mean Blood Pressure.—Martini and Dóssola made a study of the oscillographic method in comparison with the oscillometric method in the determination of the blood pressure. The determinations were made in fifty persons chosen at random. Plateau curves occurred in twenty-seven cases (54 per cent) of oscillometric determinations and in sixteen cases (32 per cent) of oscillographic determinations. In the latter cases, however, the mean blood pressure could be satisfactorily determined either by the simple study of the oscillographic tracings or by measuring the waves. In most cases the mean blood pressure was determined by the wave of larger oscillatory amplitude and in some cases by making investigations of the central waves of the plateau. In the cases in which plateau curves did not occur, the mean blood pressure was determined with more accuracy by means of the oscillographic tracings than by oscillometric observations. The authors conclude that the oscillographic method gives better results than the oscillometric method. Notwithstanding that the technic of the oscillographic is more complicated than that of the oscillometric method, the visible results and the reliability of determinations made by the former method make its use preferable to the latter. Sphygmomanometric determinations of the mean blood pressure, made for scientific purposes, should be controlled by oscillographic determinations. Figures given by sphygmomanometric observations (which may serve as a basis to establish new clinical opinions on the disturbances of the circulatory dynamics) should be considered of value after they are confirmed by oscillographic determinations.

Postdiphtheritic Polyneuritis with Predominant Cephaloplegic Symptoms.—Macera and Domenech gave two patients, aged 4 and 3 years, respectively, injections of antidiphtheritic serum in fractional doses up to a total of 135,000 units. The first injection was given three days after the onset of the diphtheria. One month later, while the children were in convalescence, polyneuritis developed, with predominant cephaloplegic symptoms. Paralysis, which involved several groups of muscles, was more intense in the cervical muscles, thus resulting in the cephaloplegia manifested by the children. In both cases there was paralysis of the velum palatinum and of the facial and optic nerves, disturbances of the voice, of deglutition and of the gait, and absence of ankle clonus and knee jerk reflexes. Daily subcutaneous injections of strychnine sulphate, beginning with 0.25 mg. and continuing with progressive doses of 0.5, 1, 1.5 and 2 mg., were of benefit in both cases. One of the patients, however, on the eighth day of the treatment and while showing a definite amelioration of the symptoms, suddenly developed a fatal bronchopneumonia. The other patient received a total of fifteen injections, making a total dose of 20 mg. of strychnine sulphate. She did well up to complete recovery in about twenty days. Serotherapy, which had been planned if the results of the strychnine treatment had not been satisfactory, was not necessary.

Archiv für Kinderheilkunde, Stuttgart

94: 241-320 (Oct. 23) 1931

*"Septic" Diphtheria and Its Treatment with Symbiosis Serum. F. von Bormann.—p. 241.
Etiology and Differential Diagnosis of Chorea Minor. G. Lenart and E. von Lederer.—p. 256.
Clinical Aspects of Perifocal Inflammation in Tuberculous Children. R. Sell.—p. 266.
Cardiac Myodegeneration as Sequelae of Primary Diphtheritic Vulvovaginitis. P. von Kiss.—p. 287.
Clinical Experiences with Sauerbruch-Herrmannsdorfer-Gerson Diet in Tuberculosis. F. Boldt.—p. 293.
Enuresis as Organ Language. A. Bretschneider.—p. 305.
Suppurative Meningitis in Nurslings, Caused by Influenza Bacilli. K. Rupilius.—p. 307.

Treatment of "Septic" Diphtheria with Symbiosis Serum.—Von Bormann states that septic diphtheria has clinical aspects which have only little in common with those of ordinary diphtheria. The presence of greenish necrotic coatings in the pharynx, the fetid odor from the mouth, the involvement of the lymphatic ring and the higher incidence of septic complications almost make it appear as if septic diphtheria were a mixed infection of scarlet fever and diphtheria. The degree of malignancy is of no importance in the determination of the septic character. Septic diphtheria may develop from the least severe as well as from the most severe forms. The fact that in septic diphtheria streptococci are found in the pharynx, in the pus of the complicating processes and in the blood stream makes it appear probable that these micro-organisms have a pathogenic significance. This theory explains the relatively greater malignancy, the failure of diphtheria serum and the greater efficacy of a combination diphtheria and streptococcus serum in cases of septic diphtheria. When symbiosis serum is employed in cases of septic diphtheria, the therapeutic effects are considerably better than when pure diphtheria serum is employed. The symbiosis serum is obtained by inoculating a horse with mixed cultures of diphtheria and streptococci from the pharynx of patients with septic diphtheria and with toxins from diphtheria and streptococcus symbiosis cultures. Because bactericidal qualities are lacking in the symbiosis serum, its efficacy must be due to the fact that it counteracts the ectotoxic poisoning, which promotes further invasion. It is therefore necessary to inject the symbiosis serum as early as possible, for only in

this manner can invasion be prevented. If invasion has already set in, the sympiosis serum has only a slight effect. Against scarlet fever intoxication the symbiotic serum is ineffective.

Deutsche Zeitschrift für Chirurgie, Berlin

233: 313-480 (Oct. 17) 1931

Action of Phenol Camphor on Normal Joint. E. Freund.—p. 313.
Paravertebral Intramediastinal Hematoma in Fractures of Vertebrae. A. Eiselsberg and E. Gold.—p. 329.
*Therapy of Chondromatous Exostoses of Pelvis. P. Walzel.—p. 337.
Traumatic Pathogenesis of Osteochondritis Coxae Juvenilis Deformans. R. Kraft.—p. 345.
Pathology of Injuries of Wrist Joint. B. Pfab and F. Zöllner.—p. 355.
Clinical and Social Value of Primary Surgical Aid in Hacking Injuries of Knee Joint. H. Lederer.—p. 387.
*Anatomic and Clinical Aspects of Tearing of Meniscus. K. von Dittrich. —p. 399.
Hospital for Accident Cases and Social Insurance. A. Kutschera-Aichbergen.—p. 413.
Trauma and Tumor Formation. W. Schosserer.—p. 421.
Value of Erythrocyte Sedimentation Reaction in Inflammatory Diseases of Bones. C. Schuberth.—p. 425.
Experiences with the Krukenberg Hand. H. von Haberer.—p. 430.
Primary Plastic Operations in Injuries of Hand and of Fingers. W. Schosserer.—p. 434.
Position of Head Fragment in Infratubercular Fractures of Humerus. H. Kunz.—p. 441.
Noteworthy Cases of Struma Maligna. O. Hoche.—p. 446.
Surgical Correction of Outstanding Ears. R. Demel and E. Feigl.—p. 453.
Surgery of Osteomas of Vault of Cranium. V. Orator.—p. 459.
New Points of View for Operative Treatment of Tuberculous Foci of Bones. P. J. Erlacher.—p. 464.
Posture Gymnastics of School Children and Experience with Abdominal Support. W. Pacher.—p. 468.

Therapy of Chondromatous Exostoses of Pelvis.—Walzel reports his observations on three patients with chondromatous exostoses of the anterior portion of the pelvic ring. One of the patients underwent surgical treatment eight years ago, and the other two cases are of a more recent date. Of the latter two, one patient was operated on, but the other would not submit to a surgical intervention and was treated with roentgen rays. In summing up his observations the author states that the three reported cases throw no light on the etiology of osteochondroma. The slight trauma mentioned in the anamnesis of one case, he considers too insignificant. In discussing the symptomatology he states that in all three cases there was a reduction of the motility of the hip joint, accompanied by pain. These symptoms are due to the infringement of the tumor on the joint space and to the pressure it exerts on nerves and vessels. The extremity on the diseased side usually shows venous stasis, but its muscles are atrophic. Exploratory excision is necessary to differentiate the chondromatous exostosis from sarcomatous degeneration. On roentgen examination the chondromatous tumor yields a comparatively light shadow and the cloddy structure reminds one of calcification processes. Because of this the roentgenologist thought of specific bone processes. In discussing the results of the treatment the author states that the partial resection of the anterior pelvic ring, in the recently observed case, was successful. The after-examination of the patient, who eight years previously had undergone a similar operation, revealed that the defect of the pubic bone did not result in hernia or in impairment of walking. Roentgenoscopy revealed only a slight callus formation. The patient who did not submit to surgical treatment had extensive chondromatous exostoses, and the roentgen treatment had no effect whatever. For this reason the author advises early radical operation.

Anatomic and Clinical Aspects of Tearing of Meniscus.—Because of the static and mechanical conditions in the knee joint, von Dittrich thinks that the tearing of the medial meniscus is due to twisting forces and he considers it possible that muscular traction is also involved in this type of injury. The tearing can take place by bending the knee as well as by overextending it. Besides the menisci, the cruciate ligaments, especially the anterior one, may be injured. The diagnosis luxation of the meniscus is justified only if inhibition of the movements indicates plainly a dislocation of the meniscus. The luxation is always secondary and is possible only after loosening of the attachments of the meniscus. If during a first injury the meniscus is only injured but not dislocated, it may, depending on the site of the tearing, heal again. In such cases conservative measures may suffice. Menisci that have been repeatedly injured or dislocated should be removed, since they cannot fulfil their function and may lead to deforming arthritis. The author considers wide opening of the joint advisable because it permits inspection of the entire joint and may reveal secondary injuries that otherwise could not be recognized and subjected to proper treatment.

Klinische Wochenscrift, Berlin

10: 2025-2064 (Oct. 31) 1931

Localization in Cerebrum. A. Jakob.—p. 2025.
Physical Determination of Volume of Circulating Blood in Human Beings. K. Hartl and H. Peter.—p. 2030.
*Demonstration of Latent Icterus by Intradermal Injection of Histamine. O. Klein.—p. 2032.
Investigations on Bones of Growing Mammals Following Injection of Various Types of Porphyrine. R. Fikentscher, H. Fink and E. Emminger.—p. 2036.
Simple Titrimetric Method for Determination of Alkali Reserve in Serum. F. Ellinger.—p. 2036.
Comparative Investigations on Alkali Reserve. J. Müller.—p. 2038.
Fate of Premature Infants During First Ten Days of Life. F. C. Hilgenberg.—p. 2040.
Can Enigmatic Processes in Growth of Nails be Explained on Basis of Theory of Thixotropism? J. Heller.—p. 2042.
Method for Testing Gastric Function: Acidity Curve During Spontaneous Secretion of Empty Stomach. L. Dinkin and Z. Lichtig.—p. 2043.
Rapidity of Decomposition of Blood Platelets. H. Baar and Lili Canaval-Székély.—p. 2045.
Development of Tetany During Childhood. E. Rominger, H. Meyer and E. Bomskow.—p. 2046.
Anterior Lobe of Hypophysis and Thyroid. S. Janssen and A. Loeser. —p. 2046.
Influence of Anterior Lobe of Hypophysis on Iodine Content of Thyroid. A. Loeser.—p. 2047.
Nutrition of Gravidas. A. Bock.—p. 2047.

Demonstration of Latent Icterus by Intradermal Injection of Histamine.—Klein found that intradermal injection of histamine in patients with icterus effects an intensification of the yellow coloration in the region of the skin that is under the influence of the local histamine action. This intensification of the yellow color is first noticeable in the region of the hyperemic area around the wheal, later, however, in the region of the wheal itself. Various factors indicate with certainty an increased perfusion of the bile pigments through the capillaries, and its local accumulation outside the capillaries, in the fluid of the wheal or in the tissues. In patients with slight or with latent icterus, in whom the bilirubin content of the blood is only slightly increased, there develops an intensive yellow discoloration in that region of the skin which is under the influence of histamine. Thus it is possible to diagnose a latent icterus by the histamine wheal test. Even a slight increase of the bilirubin content of the blood can be demonstrated by the local yellow discoloration resulting from the histamine wheal test. In hemolytic icterus, in which the direct bilirubin reaction is negative but the indirect (following alcohol precipitation) is positive, the histamine test is likewise positive. However, there is a slight difference when compared with the cases with direct increase in the bilirubin (hepatogenic) icterus. In hemolytic icterus the reaction of the histamine wheal test is less marked and it is positive only if the bilirubin content is higher than 1 mg. per hundred cubic centimeters, whereas the reaction in hepatogenic icterus is more intense. But even in hemolytic icterus the histamine wheal test becomes positive at a time when the icterus is still latent.

Monatsschrift für Kinderheilkunde, Berlin

51: 81-160 (Oct. 15) 1931

Treatment of Rickets and of Spasmophilia with Viosterol Milk Powder. W. Catel.—p. 81.
*Hernia of Esophageal Hiatus in Child. E. Unshelm.—p. 94.
*Emphysema of Skin in Measles. Liese Goebel.—p. 106.
Criticism of Practicability of Binet-Simon's Intelligence Tests. P. Váradi.—p. 110.

Hernia of Esophageal Hiatus in Child.—Unshelm states that hernia of the esophageal hiatus, which belongs to the group of diaphragmatic hernias, has received little attention from pediatricians because generally the symptoms become manifest only during adulthood. He, however, observed it in a nursling. After giving a detailed description of the case he discusses in general the pathology, the various forms of this type of hernia, the symptomatology and the prognosis. He then compares the symptomatology of the case that he observed with the symptoms described in the literature and finds that

they correspond closely, but in the described case there was one special symptom, hitherto not described, which aided greatly in the correct diagnosis of this case; namely, a loud rumbling in the abdomen and in the chest. Occasionally this rumbling was accompanied by sounds such as are heard if intestinal contents are pressed through contracted portions of the intestine. But in spite of the large number of symptoms, they alone do not permit a definite diagnosis. In regard to the diagnostic value of roentgenoscopy, it is stated that simple roentgen examination is not sufficient but that contrast filling is required. The treatment of hernia of the esophageal hiatus should be surgical in most cases. In infants the best method of approach is by a laparotomy; in adults, the transpleural route is usually better. Concerning the operative results the author states that the hernias of the esophageal hiatus permit a more favorable prognosis than other diaphragmatic hernias.

Emphysema of Skin in Measles. — Goebel observed a generalized emphysema of the skin in a child with measles. Because emphysema of the skin occurs rarely during measles, she feels justified in reporting this case. The clinical history is followed by a discussion of other conditions in the course of which emphysema develops. Older reports mention the larynx and the lung as the starting points, and more recent reports discuss emphysema of the skin in the course of infectious diseases. Since some consider an increased expiratory pressure as the primary factor in the development of cutaneous emphysema, its occurrence during whooping cough, especially when it is accompanied by pneumonia, is understandable. It has also been observed during influenza. In discussing the pathogenesis of emphysema in the reported case, the author points out that the cough was not severe; however, the anamnesis revealed that a whooping cough had preceded, and it is probable that the pulmonary tissues had been injured by the prolonged attacks of coughing and that this, together with toxic influences and with a slight new involvement of the lung, led to the cutaneous emphysema. The restlessness of the child and the increased coughing led to a rapid spread of the emphysema, and a slight dyspnea developed. An incision did not become necessary. The child was kept in a condition of somnolence by the administration of phenobarbital sodium. This, together with the continuous administration of oxygen and the superficial respiration produced in this manner, proved helpful. The food was given in the form of fluids, but care was taken that the child received a sufficient number of calories.

Polska Gazeta Lekarska, Lwów

10: 885-904 (Nov. 15) 1931

*Treatment of Tuberculous Elbow in Adults by Resection and Reconstruction. A. Gruca.—p. 886.
Osteomalacia in Light of Experimental Observations. A. Garbień.—p. 891.
Structure of Red Blood Pigment. P. Ostern.—p. 892.
Differentiation of Coma in Diabetic Persons. L. Szyfman.—p. 894.

Treatment of Tuberculous Elbow by Resection and Reconstruction.—Gruca describes a reconstruction done simultaneously with resection of a tuberculous elbow joint. The diseased process is removed down to the line of demarcation, and an artificial joint surface is carved out in the healthy bone. To prevent adhesions, the raw surface is covered with fascia or fixed animal membrane (submucosa of animal intestine) to minimize callus formation. Hematoma is the usual complication, so drainage is advocated. In uncomplicated cases, passive movement should be started in from ten to fourteen days. The contraindications are age below 20, an acute form of the disease, and greatly advanced general symptoms.

10: 905-924 (Nov. 22) 1931

Treatment Review of Cervical Cancer. J. Zubrzycki.—p. 905.
*Roentgen Therapy in Menopause. W. Grabowski.—p. 909.
Structure of Red Blood Pigment. P. Ostern.—p. 910.
Hygiene and Physical Culture. A. Lidzki.—p. 912.

Roentgen Therapy in Menopause.—Grabowski states that in the menopause roentgen therapy is far more economical to the patient than organotherapeutic preparations because of their price and gives satisfactory results in severe cases often unaffected by glandular substitution. The application is simple, consisting of irradiation of the pituitary body through both temples and the frontal region at intervals of three days. The series of applications is repeated every three weeks if conditions demand. Three applications are sufficient in most cases. In stubborn cases, accessory irradiation of the thyroid (after Borak of Vienna) brings speedy relief; this combination gives better results in severe manifestations. There is no danger of injury of the skin, deeper structures or brain tissue, experiments having proved that brain tissue is insensitive to roentgen rays. The thyroid is irradiated ten days after the pituitary treatment. The dose used is 180 kilovolts and 3 milliamperes through a filter of 0.5 mm. of zinc and 2 mm. of aluminum, and at a distance of 30 cm.

Terapevtichesky Arkhiv, Leningrad

9: 133-208, 1931

Clinical Aspect of Index for Blood Pressure. T. T. Glukhenkiy and G. P. Rudnev.—p. 138.
*Genesis of Functional Systolic Heart Sounds. K. F. Mikhailov and V. G. Popov.—p. 148.
Chronic Miliary Tuberculosis. V. A. Valdman.—p. 158.
Myeloma. A. Vertzberg and A. Berlyand.—p. 166.
Rôle of Hemoglobin in Respiration. L. G. Smirnova.—p. 175.
Biochemical Changes in Blood and Urine Under Amidocompounds and Nitrocompounds of the Aromatic Group of Poisons. A. Bergauz.—p. 182.
*Relation Between Hygroscopic Property of Tissues and Colloido-Osmotic Pressure of Plasma Proteins. E. M. Tareev, I. M. Rovinskayo and N. V. Shtempel.—p. 185.
*Large Doses of Calcium Chloride in Treatment of Ascites and Edema. P. O. Dmitriev.—p. 193.
Head's Zones in Typhoid. I. D. Itzkovich.—p. 200.

Genesis of Functional Systolic Heart Sounds.—Mikhailov and Popov believe that their studies show that most of the functional systolic sounds are the result of a disorder in the constrictive and tonic function of the papillary muscle of the atrioventricular valvular apparatus, arising as a result of some pathophysiologic dystrophies, among which the sympathetic nervous system and afterward the cardiovascular system play important parts. Functional heart sounds can be experimentally produced in a normal heart. An attempt to divide sounds into functional and nonorganic proves to be far fetched. According to the authors' researches there are no lines of demarcation in heart sounds caused by nonorganic pathologic conditions of the heart muscles (functional according to French schools) in which there are no anatomic changes in the cardiovalvular apparatus. So-called functional two-sided insufficiency may give an auscultatory picture typical of organic insufficiency of the mitral valve. In differential diagnosis, one should consider the sum of the symptoms in which the changes in sounds under the influence of endogenous and exogenous factors will be spoken of as functional changes.

Relation Between Hygroscopic Property of Tissues and Colloido-Osmotic Pressure of Plasma Proteins. — Tareev and his co-workers used the refractometer to determine the total protein content of the blood plasma and the nephelometer to determine the protein fractions of the same plasma. In this way, 100 cc. portions of blood were analyzed for serum, globulin and fibrin. The total oncotic pressure of the plasma proteins was determined by calculation of the sums of the specific osmotic pressures of the various protein fractions. The authors conclude that the oncotic pressure of plasma proteins does not bear direct causal relationships; the pressure of plasma proteins is at the lowest level in nephritic edema. In renal diseases, the lowering of the oncotic pressure by the proteins of the blood is parallel to the rise of the hygroscopic capacity of the tissues and the degree of edema. The relationship between the hypo-oncotic function of the blood and the hygroscopic function of the tissues is evident in cachectic conditions and also to a lesser degree in renal insufficiency and acute infections. Improvement in the nephritic and cachectic edemas is accompanied by a rise in oncotic pressure and a lengthening of the period of imbibition. In cardiac decompensation, edema is not accompanied by a drop in oncotic pressure of the plasma proteins, and therefore the parallelism between oncotic pressure and tissue hygroscopy does not exist.

Calcium Chloride in Treatment of Ascites and Edema. —Dmitriev describes seven cases of ascites with edema in which the administration of the usual diuretics did not avail, but when from 10 to 30 Gm. of calcium chloride was administered daily, remarkable improvement resulted. The diuretic action was apparent not at once but after several days. Together with

increased diuresis, the chlorine content of the urine and the acidosis were also increased. The diets were comparatively chlorine free. The author recommends the administration of calcium chloride in nephritis and edema.

Finska Läkaresällskapets Handlingar, Helsinfors

73: 755-829 (Oct.) 1931

*Can Cause of Congenital Spastic Diplegia or Little's Disease Be Gas Emboli Originated in Fetus During Delivery? F. Langenskiöld.—p. 755.
*Resection of Scalene Muscles Together with Two Highest Ribs in Pulmonary Tuberculosis. H. Elving.—p. 772.
*Treatment of Croupous Pneumonia with Quinine Injections. H. Roos.—p. 778.
Pernicious Anemia and Cancer. F. Saltzman.—p. 790.
*S. 'pingography in Sterility. J. J. Chydenius.—p. 797.

Theory Concerning the Cause of Congenital Spastic Diplegia.—Langenskiöld presents the objections to the existing theories on the cause of Little's disease. He calls attention to the close agreement between this condition and the disease, known as divers' disease, due to abrupt transfer after working under a pressure of more than two atmospheres to a medium with much lower pressure, and he regards the condition at birth as analogous to that of the diver. It seems to him that, in delivery, conditions occasionally arise which would make possible the origin of an air embolus in the fetus, and that the theory of a gas embolus would explain both the clinical and the pathologic-anatomic changes occurring in congenital spastic diplegia.

Resection of Two Highest Ribs in Pulmonary Tuberculosis.—Elving performed exeresis of the scalene muscles and the first or first and second ribs (Loeschke's operation) under local anesthesia in eleven patients with marked tuberculous changes in one lung. He considers exeresis and Loeschke's operation more effective than simple exeresis and relatively without danger, and intends to apply it in cases in which he would previously have used exeresis; that is, mostly as a preliminary operation before total thoracoplasty.

Treatment of Croupous Pneumonia. — In 105 cases of croupous pneumonia in which Roos used treatment with injections of quinine, the mortality was 8.6 per cent. In fifty-six patients aged from 15 to 50 with start of quinine treatment during the first four days of the pneumonia, the mortality was 3.6 per cent; in fifty-nine patients in the same age group without quinine treatment, the mortality was 11.9 per cent. The author is inclined to assume that quinine injections exert a favorable influence in croupous pneumonia.

Salpingography in Sterility.—Chydenius reports his observations in thirty cases with sterility of at least five years' standing. In one case of secondary sterility of five years' duration and one of primary sterility in a woman aged 39, with unsuccessful treatment for sixteen years, conception occurred directly after the treatment. In one case with old tuberculosis of the lymph nodes of the neck a tuberculous peritonitis developed after salpingography; there were no other accidents.

Norsk Magasin for Lægevidenskapen, Oslo

92: 789-932 (Aug.) 1931

*Cerebellum and Cerebellar Localization. J. Jansen.—p. 789.
*Fracture of Ankle: Case. R. Grønn.—p. 805.
*Iodine Treatment and Iodine Mistreatment in Thyrotoxicosis (Exophthalmic Goiter). J. Holst.—p. 809.
*After-Examinations (from Six to One Hundred and Fifty-Nine Months After Operation) of One Hundred and Twenty-Two Eyes Operated on with Antiglaucomatous Iridencleisis According to Holth. H. G. A. Gjessing.—p. 813.
*Neurosis-Like Pictures in Schizophrenia: Review of Early Symptoms in Schizophrenia. R. Bing.—p. 837.
*Case of Detrusor Paralysis with Azotemia. O. Stub.—p. 854.

Cerebellum and Cerebellar Localization.—The purpose of Jansen's review is to illuminate the problem of cerebellar localization, especially from the anatomic point of view. He finds that while the anatomic investigations have revealed nothing which excludes the possibility of a localization—in fact, localization in one form or another is suggested by certain facts, particularly the correlation between cerebellar morphology and differentiation within the different muscle territories (Bolk)—the results of anatomic, experimental and clinical study in this field leave the whole question of functional localization in the cerebellum unsettled. He concludes that valuable results can be attained only by the intimate cooperation of anatomists, physiologists and clinicians.

Case of Fracture of Ankle.—A fall while skiing caused abnormal dorsal flexion in the ankle in Grønn's patient, resulting in a transverse fracture of the talus. The foot fell into equinovarus position. Bloodless reposition, done under ether anesthesia ten days later, gave ideal results, as established roentgenologically. Three months after the accident, the patient had fully recovered. When bloodless reposition is impossible, surgical reposition (Simon) is advocated instead of the earlier operative method with complete or partial resection of the talus.

Iodine Treatment and Mistreatment in Thyrotoxicosis.—Holst says that in thyrotoxicosis the only effective iodine treatment is iodine medication that utilizes the first phase of the iodine effect. An iodine medication that brings the patient into the second stage is an equally active mistreatment. At present, iodine treatment in thyrotoxicosis is to be applied only as an adjuvant to surgical treatment in a brief preoperative and postoperative treatment, to be directed by the surgeon who is to operate. For the time being, it may thus be said that there is no medical, only a surgical, iodine treatment in thyrotoxicosis.

Eyes Operated on with Antiglaucomatous Iridencleisis.—Holth's antiglaucomatous iridencleisis with meridional iridotomy is Gjessing's method of choice in chronic glaucoma. Of his 152 iridencleises since 1911, 22 were performed with total or peripheral iridectomy, and 102 with meridional iridotomy. After-examinations made by him in 122 eyes, from 6 to 159 months after surgical treatment, showed that the tension was normalized in 87.7 per cent, the vision unchanged or improved in 79.5 per cent, and the field of vision unchanged or improved in 83.2 per cent. Averaging these values gives good results in 83.5 per cent. He says that there seems to be little danger connected with iridencleisis, particularly with meridional iridotomy, even in advanced glaucoma, and neither advanced age nor marked limitation in the field of vision is a direct contraindication.

Neurosis-Like Pictures in Schizophrenia.—Bing gives a general description of the neurosis-like condition in beginning schizophrenia and mild or atypical forms of schizophrenia, showing the common features that distinguish them from "true" or "uncomplicated" neuroses.

Detrusor Paralysis with Azotemia. — Stub reports the case of a woman, aged 74, in whom there appeared during or after an acute abdominal disturbance a detrusor paralysis and azotemia. The patient could not urinate. With daily catheterization the residual urine decreased and finally disappeared after eighteen days. About the same time the urea concentration in the blood became normal. The author explains the pathogenesis of the azotemia on the basis of the Cushny-Rehberg kidney function test as due to an increased resorption of urea in the tubuli on account of the slow urinary stream.

92: 1-46 (Aug.) 1931. Supplement

*Sterility in Women. H. Natvig.—p. 1.

Sterility in Women.—Out of 294 cases of primary or secondary sterility in which the patients were given conservative operative treatment by Natvig, conception occurred in 144, or 48.98 per cent. From Norway's official statistics on childless marriages and his personal observations, the author concludes that sterility in women is frequent and in Norway occurs about eight or nine times as often as impotence in men. Primary sterility is relatively seldom due to congenital malformation; about one third of all cases depend on incomplete development of the genital organs in childhood, and the majority of cases on acquired diseases. The causes of primary infertility, characterized by habitual abortion, are about the same. Secondary sterility is always due to acquired diseases. The reproductive power is most often destroyed by inflammatory processes, gonorrhea, puerperal infections and tuberculosis dominating as factors in sterility. Inflammation is quite often transferred to the internal genitalia by neighboring organs, and the sterilizing effect of grave appendicitis is not sufficiently recognized.